Supreme Court of the United States.

No. 259.

THE AMERICAN WOOD PAPER COMPANY,
Appellant,

vs.

THE FIBRE DISINTEGRATING COMPANY.

No. 362.

THE FIBRE DISINTEGRATING COMPANY,
Appellant,

vs.

THE AMERICAN WOOD PAPER COMPANY.

Appeals from the Circuit Court of the United States for the Eastern District of New York.

ARGUMENT

On Behalf of the Fibre Disintegrating Company.

R. W. RUSSELL,
Of Counsel.

NEW YORK:
EVENING POST STEAM PRESSES, 41 NASSAU STREET, CORNER LIBERTY.

1873.

POINTS.

THE WATT AND BURGESS PATENTS.

Point 1.

Variance from Original Specification.

The original patent of 1854 was invalid because it was not for the same invention as that described in the English provisional specification, filed 19th August, 1853, to which date the American patent has relation.

PAGE.

The same objection applies with greater force to the reissued patents of 1863. 47 to 50

Point 2.

The Original Patent—Concealment.

The original patent of 1854 was invalid on account of the concealment of the alleged discovery or invention of the patentees, set forth in the reissued patents. 50

Point 3.

Reissue—Defective Allegation.

The re-issued patents of 1863 are invalid, the allegation required by the statute to authorize such reissue not having been made. 51

Point 4. PAGE.

Reissue—Not same Invention—Disclaimer—Estoppel.

The re-issued patents of 1863 are invalid, not being for the same invention as that patented in the original patent of 1854, and being in part for an invention disclaimed.

Plaintiffs are estopped by the disclaimer. 52 to 63

Point 5.

Reissue—Two Patents instead of one.

The reissued patents are invalid because they are not for distinct and separate parts of the thing patented. 64

Point 6.

Two Reissued Patents—Conflict between them.

The reissued patents are invalid because they are both for the same invention. 65

Point 7.

Reissue—Concealment—Insufficiency of Specification.

The reissued patents of 1863 are invalid on account of the concealment of the alleged discovery or invention of the patentees. 66 to 68

And for insufficiency of the specification.

Point 8.

Want of Novelty—Patent too broad.

The reissued patents are too broad, there being, at all events, no novelty in boiling some vegetable fibrous sub-

stances in a solution of caustic alkali, under a pressure at or near 300° Fah., for the manufacture of paper pulp therefrom. PAGE.

This objection is not removed by the Act of 1837, sec. 9. 69 to 72

Point 9.

Invention disproved.

It is evident that the patentees had not made the alleged discovery or invention when they obtained the English patent. 73

Point 10.

Single-stage Process.

If the novelty consists in the use of a single-stage chemical process, then the plaintiffs' case fails, as the defendants do not use such process, but a totally different one, viz., a compound process, whereby the woody matter is reduced to pulp before the final alkali treatment. 74

THE BOILER PATENTS.

Point 11.

Combination— Want of Novelty.

Keen's Boiler Patent of 1859 is for a combination of stirrers, of a particular form, with an ordinary expansion-chamber and discharge-valve. Stirrers and discharge-valves are old.

Defendants used a different stirrer and discharge-valve. Stirrers are abandoned as useless. 75

The patent is void, one of the elements of the combination being useless. PAGE. 75, 76

Point 12.

Combination— Want of Novelty.

Keen's Boiler Patent of 1863 is :—1. For a perforated diaphragm having a perforated well or cylinder. 2d. For an ordinary discharge-valve in combination with the peculiar diaphragm.

Defendants did not use such a diaphragm. And there is no novelty in the method adopted for discharging the boiler. 77 to 81

THE MELLIER PATENT.

Point 13.

Non-Patentability of high-pressure boiling.

Mellier was not the first to discover the utility of the use of a steam-pressure as high as 70 lbs. in boiling, in a solution of caustic alkali, fibrous materials for the manufacture of paper pulp.

And even if he had been, he could not take a patent for that use alone, as prior patents call for the use of high-pressure boiling, without limit.

And the complainants are estopped by the allegation in their bill, that Watt and Burgess preceded Mellier. 82 to 93

Point 14.

Pure Caustic Soda—No novelty.

There was no novelty in the use of pure caustic soda in boiling fibrous materials under pressure, to make paper pulp. 94 to 96

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Point 15.

The Patent not good for the combination.

There being no novelty in the process of boiling fibrous materials in a caustic alkaline solution at 70 lbs. pressure, and no novelty in the use of caustic alkali (whether "pure" or otherwise) in the pulping process, there could be no patent for a process merely *combining* those two things with the use of a specified strength and quality of the alkaline solution.

At all events, there should be a discovery of a chemical compound—a combination of heat and alkali, whereby we have the proper quantity of alkali necessary to unite with the acid in the straw, so that an excess of alkali would be waste.

And there is no proof that the Mellier patent shows such a combination. 97

Point 16.

Specification too indefinite for combination Patent.

The patent does not sufficiently define the alleged novelty of the invention, as consisting in a combination, and the reduction of the pulping process to a single stage. 98

Point 17.

Conflict between the Watt and Burgess and Mellier Patents.

Unless the Mellier patent is merely for a combination, it is invalidated by the Watt and Burgess patents. 99

Point 18.

Combination—Infringement of.

If the patent be valid as a combination patent, it is not infringed by the use of part of the elements of the combination. 100

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Point 19.

Meaning of 70 *lbs. pressure.*

The patent referring to 70 lbs. pressure, and directing the operator to work by the gauge, does not mean $55\frac{3}{10}$ lbs. by the gauge, but means 70 lbs. by the gauge. 101 to 108

Point 20.

The minimum pressure.

The patent is not infringed by the use of a pressure less than that specified as the minimum. 109

Point 21.

Patent confined to Straw.

The patent is confined to straw; Mellier having for special reasons chosen to confine his *claim* to straw, although the specification pointed out that similar fibrous materials could be treated in the same way. 111 to 115

Point 22.

As to materials requiring same treatment as Straw.

Even if the patent extends to other fibrous materials besides straw, it is confined to such materials as require the same treatment to produce a bleachable pulp, by the use of the weak alkaline solution prescribed in the specification.

The bamboo treated by the defendants required and received a different treatment. 116

Point 23.

PAGE.

Patent too broad.

If by 70 lbs. is meant $55\frac{3}{10}$ lbs. by the gauge, and if the patent applies to all other fibrous vegetable substances besides straw, and is not limited to the use of alkali of a specific strength and quality, then the patent is defeated by showing the prior use in the United States of 60 lbs. pressure in boiling in a solution of caustic alkali, hemp tow shives, and cotton seeds, to make pulp for white paper by a single stage process.

This objection is not removed by the Act of 1837, sec. 9. 121 to 124

Point 24.

Patent for single stage process.

The plaintiff's proposition that the prior processes of boiling in caustic alkali, under pressure, do not invalidate the Mellier patent, because the novelty of Mellier's invention consists in the use of a single stage process, is inconsistent with the proposition that defendants infringe the patent in using a double or treble stage process, chemical and mechanical. 125 to 130

Point 25.

Double stage process.

The process used by the defendants was not a single stage process.

How defendants made pulp from *straw* for *brown* paper.

How defendants made pulp from *bamboo* for *white* paper. 131 to 133

Point 26.

Patent confined to chemical treatment specified.

The patent is confined, as to the alkaline solution to be used, to a solution of "*pure* caustic soda" of the strength of 2° to 3° Beaumé (in combination with the prescribed steam pressure).

Mere proof of the use of a solution of caustic alkali weaker than $3\frac{1}{2}°$ B., or not shown to be *pure* caustic alkali, is legally insufficient. PAGE. 134 to 1

Point 27.

Point of Fact.—Alkali used by defendants.

1. *On straw.*—The pulp made by the defendants from straw was only fit for brown paper, and was accordingly made into brown paper.

And there is no proof showing what was the strength of the solution of caustic alkali used by the defendants in making that pulp, nor whether the caustic soda was pure 138 to 14

2. *On Bamboo.*—There is no proof that the defendants, in making bamboo pulp for white paper, used an alkaline solution of the kind, strength and quality prescribed by the patent.

The State of the Art of Reducing Vegetable Fibrous Substances to Paper Pulp prior to 1853, as shown by the Foreign Patents and Publications in evidence in this case.

In the defendants' answer, many patents, American and foreign, are cited to show that the processes described in those patents embrace the elements of the processes of Watt & Burgess and Mellier and for the purpose of showing the progress of the art of reducing fibrous vegetable substances to paper pulp from an early period.

These patents show that Watt & Burgess and Mellier are not entitled to be treated as the inventors or discoverers of the manufacture of paper from wood, straw, &c., and therefore should be confined to the particular processes which they claim to have invented.

(See abstract of those patents in defendants' answer; Record, fol. 97 to 105).

The use of caustic alkali for the reduction of fibrous substances to pulp, is shown by those patents to be of ancient date, and the practice of boiling fibrous material in caustic alkali solutions, under pressure, to make pulp, was well known and commonly used for many years prior to the date of Mellier's patent.

The following patents are in evidence in this case:

Campbell's *English patent*, 28*th December*, 1792. (*Record, fol.* 584).

It calls for the use of *caustic lye*, in which the materials fit to make paper are boiled, then bleached. The patent calls for a compound process, consisting of two or more chemical stages, to be regulated according to the quality of the paper to be made (fol. 586).

CUNNINGHAM'S *English Patent*, 10*th December*, 1794.
(*Record, fol.* 588.)

Patent for making paper from rags, ropes, &c., by boiling same for a specified time in potash lye, the making of which is described.

This patent also calls for a compound process. The first boiling is followed by the use of bleaching liquor; then there is another boiling in lye, and a final bleaching.*

* This patent is noteworthy on account of the fact that the patentee calls for the use of a *clarified caustic* alkali, and shows how to make it so as "to prevent any of the particles of the lime that may remain in the water from injuring the pulp," &c. (fol. 589).

TURNBULL'S *English Patent, Nov.* 15, 1800.
(*Record, fol.* 593.)

Patent for bleaching cotton, flax, hemp and wool, specifies a boiling *in lye under pressure*. It directs the use of a safety-valve, and points out that by *raising the heat* considerably above the boiling point, the *dissolving power* of *the alkaline lye* is *greatly increased*, and the resinous, gummy, or other impurities, are eliminated from the materials under process, and a *great saving is made in the alkalies* and other ingredients employed for bleaching (fol. 596).

Although Trumbull did not apply his discovery to the reduction of fibrous substances to paper pulp, it was obviously applicable to that purpose, for the reason which he gives in his patent, viz., that the dissolving power of the alkali was greatly increased by the steam pressure.

KOOP'S *English Patent, Feb.* 17, 1801.
(*Record, fol.* 599.)

Patent for manufacture of paper from *straw*, refuse of hemp, &c., and different kinds of wood and bark, by a compound process, consisting of two or more stages.

The materials are steeped in lime water, with or without crystal of soda or potash, then boiled in crystal of soda or potash, then washed and boiled again in like manner (fol. 600).

MAGAW'S *American Patent*, 8th *March*, 1828.
(*Record, fol.* 667.)

Patent for making paper from *straw* and other vegetable substances, by boiling in lye a *long time*, until the vegetable matter or knots become soft or pulpy, or *steep* the materials in the solution several days until the same effect is produced.

WOOSTER AND HOLME'S *American Patent*, 4*th August*, 1830.
(*Record, folio* 662.)

Patent for the manufacture of paper from wood. The wood is reduced to shavings and boiled in alkali. "To every 100 lbs. of the wood thus reduced put from 12 to 18 lbs. of alkali, either vegetable or mineral, in proportion to its quality for strength."

Time for boiling not stated.

DESGRAND'S *English Patent*, 13*th December*, 1838.
(*Record, folio* 605).

Patent for making paper and pasteboard from wood by a cheap process, lime only being used. He subjected wood chips to *maceration*, in a bath of *milk of lime*, from 3 *to* 6 *weeks*.

The macerated material is then pounded and is suitable for pasteboard (fol. 606).*

MONTGOLFIER'S *French Patent*, *February* 7*th*, 1838.
(*Record, folio* 870.)

Patent to Montgolfier Freres, the celebrated French paper-makers and aeronauts, for the manufacture of paper from wood, &c., by a *compound process* of *preliminary pulping* and *subsequent* treatment in *alkaline solutions* under *pressure*.

In operating on wood the patentees give the following process:

*All the common straw-paper made in modern times is made by subjecting the straw to a solution of lime. It is merely boiled in open tubs for 10 or 12 hours, (the process of maceration being too slow.)

1st. Choose the wood having the longest fibre.

2d. Macerate to aid the departure of the gluten, resin, &c.

3d. Facilitate such departure by boiling in an *alkaline lye at high pressure.*

4th. Submit the wood thus treated to the action of rollers.

5th. Boil in lye again as before.

6th. Bleach.

The patent describes the apparatus used in the manufacture, and refers to a process of *bleaching* in vacuo, for which a secret patent is attached (fol. 871).

The result is declared to be a pulp "resembling that of cotton, perfectly fitted for the manufacture of paper, and of a superior white color" (fol. 870). The Lombardy poplar is recommended as the best wood for the purpose.

Reference is made to the manufacture of paste-board. "Being able to manufacture wood paper of any thickness as desired, and the material being cheap, an excellent pasteboard, having the stiffness of wooden boards, can be made."

He proposes to mix bitumen and limestone with the pulp, and make a material suitable for ceilings, pavements, &c.

A machine for cutting up the wood is fully described.

In the second patent (dated October 16, 1838), of additions and improvements, the following process is given (*fol.* 881), somewhat differing from the former one.

The wood is reduced to chips—soaked in lime—crushed—then boiled "in a close vessel, with a solution of caustic potash (potash rendered caustic by the addition of lime), and boiled *under pressure* for 12 hours."

Then, if white paper is to be made, the dissolved resin in the pulp is washed out with hot water, then bleached.

They propose to make roofing for houses, tubes, water-pipes, troughs, sheathing of vessels, flooring for rooms, &c.*

* Dr. Rand gives an opinion (fol. 184, q. 36), that the resin in the wood was not dissolved by Montgolfier's process. He deduces this erroneous conclusion from this passage in the patent "when a brown paper or cardboard is to be made, it is useless to bleach it; then instead of removing the soluble gluten or resin, it is again concreted and precipitated in the pulp by means of a metallic salt or by alum" (fol. 881).

It is distinctly stated that the resin is fully dissolved by the action of the "*caustic alkaline solution under a given pressure*," and "that finally at the end of these operations the *resin* was converted into a soap *soluble* in water, the ligneous fibres of the wood remaining *bare*" (fol. 880).

Dr. Rand thinks the process did not prove profitable. That is probable. Neither could the process now used by plaintiffs have been profitable at that time, even although the alkali should have been restored and used over again, as it is by plaintiffs, without which their process would even now be unprofitable.

The plaintiffs abandoned their process in 1857 as unprofitable, and used paper from rags, because they were at that time cheap.

Plaintiff's counsel argue that Montgolfier could not have made *good* pulp fit for *white* paper, because he states that the wood loses only 30 per cent. in weight.

But it must be remembered that his invention is not confined to the manufacture of pulp for white paper, but is chiefly directed to the manufacture of pulp for coarse paper, for pasteboard, for roofing paper, for sheathing of vessels, flooring, water-pipes, troughs, &c., requiring very coarse pulp only (fols. 874, 883 to 888).

In Montgolfier's time rags were used for the manufacture of coarse paper and pasteboard, and he shows the greater economy of the use of wood (fol. 871).

In making white pulp from straw, the shrinkage is about 60 per cent. (fol. 414, q. 108), but in making ordinary brown paper and pasteboard, the shrinkage is about 33 per cent. (fol. 414, q. 109).

In giving an estimate of "the cost of manufacturing over and above that of rags," *i.e.* comparing the cost of wood pulp with that of rag pulp, Montgolfier does not show the difference between the cost of white and brown pulp.

In making the former, the cost of *bleaching* would be considerable, and all the resinous matter dissolved by the high pressure boiling with caustic alkali would be washed out of the pulp, making the shrinkage much greater than in the manufacture of coarse wrapping paper, pasteboard, &c.

Dr. Rand is evidently in error, in his assumption that Montgolfier's estimate of loss and cost has no reference to the last-mentioned articles.

WISE'S *French Patent, May 12th*, 1838.

(*Record, fol.* 897).

This is a patent for a rotary boiler, similar to Spofford's, which was patented in the United States in 1840, "for treating with lye and bleaching rags and *other materials* used in making paper."

"The principle upon which the above invention rests consists in keeping the materials to be treated in constant motion, and in subjecting them to *great heat*, which is kept up during the entire operation."

It is shown that the "alkaline liquor," in which the material

is boiled in the closed boiler, constantly penetrates the materials under treatment, as the boiler revolves.*

*Plaintiffs' witness, Dr. Rand, says this is only a patent for a boiler (fol. 184, p. 37). It is for a high pressure boiler for paper pulp, and it shows how materials used in making paper can, whilst being boiled under pressure in caustic alkali (subjected "to *great heat*"), be at the same time agitated, so that the boiling lye shall pass repeatedly through the material.

LEGOUX *French Patent, March* 12, 1839.

(*Record, folio* 962.)

Patent for the manufacture of paper pulp, for paper and pasteboard, from wood, straw, hay, &c., "by means of mechanical apparatus and chemical processes."

The material is, first, by the mechanical means described, reduced to a kind of tow, resembling the half stuff obtained from rags" (fol. 963).

The second operation is a chemical process. The material prepared as above is "boiled for a longer or shorter time under a pressure of 3 to 4 atmospheres," in a solution containing boracic acid and common soap, "as caustic as possible." "To render this operation more effective, it may be preceded by a maceration of the substance in a caustic lye." *

* This, it will be observed, is a two-stage chemical process. Plaintiff's counsel argues that although the boiling under pressure might be preceded by a maceration of the substances in caustic lye, there "was no direction to use heat or pressure in connection with the alkaline solution." The answer is that a maceration in a strong caustic lye would make the solution in which the mixture is afterwards boiled under pressure, a caustic alkali solution.

This is the first patent in which we find the maximum pressure suggested. It is about 3 *or* 4 atmospheres, "de trois ou quatre atmospheres environ" (fol. 959).

In Montgolfier's patents "*high pressure*," without any limit, is called for.

SPOFFORD'S *Am. Pat., Sep.* 2*d*, 1840.

(*Fol.* 670.)

Patent for a "*process*" for preparing rags and other *materials* for making pulp in the manufacture of paper, *and the machinery* for carrying the same into effect."

"The invention consists in digesting with an alkaline or other liquid in a *close turning vessel*, the rags or other fibrous materials for making paper pulp, the heat being applied to the exterior of the vessel, or by steam introduced within it" (fol. 671).

The patent describes the boiler, and states it "should be made of iron boiler-plate or other suitable material *strong enough to resist any internal pressure to which the machine may be subjected*" (fol. 671).

It gives the dimensions of the boiler and the proper charge to fill it, but adds "when other materials than rags are to be operated upon, as, for example, *straw*, cotton waste, &c., the proportions of the charge will vary" (fol. 672).

The patent sets forth the advantages of the rotary motion of the boiler, particularly "when the more refractory materials used in the manufacture of paper," "such, for example, as *straw* and cotton waste" are treated "*as the knotty portions of the straw*, and the greasy portions of the cotton waste were penetrated with difficulty by the digesting liquid, aided by the slight agitation produced by the boiler alone" (fol. 675).

But by the turning of the boiler an agitation is created which intermingles the straw and the digesting liquid with the charge, "the above mentioned *refractory* materials are penetrated thoroughly, and acted upon by the digesting liquid and the heat" (fol. 675).*

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* Plaintiff's counsel say this is only a patent for a boiler. But it is to be observed that the patent describes a boiling of straw, &c., in an alkaline solution under steam pressure, which plaintiffs claim to have been the invention of Mellier in 1854.

WRIGHT'S *English Patent*, 14*th December*, 1843.
(*Fol.* 627.)

This is a patent for making paper from straw, jute, &c.

The invention is said to consist, amongst other things, in "the peculiar apparatus or machinery employed for the purpose of boiling the same (the straw) by *high pressure steam*" (fol. 627).

1. The straw is first boiled 12 hours in tubs covered down with lids, and made steam-tight, with safety-valves (fol. 628).

2. The straw and liquor are drawn off by means of pipes and valves into a washing-tub with a false bottom, where the straw is washed with water (fol. 628).

3. The straw is now subjected to the grinding action of rollers, and reduced to *pulp* (fol. 629).

4. It is then, after being washed, placed in "close iron kiers, where it is to be boiled again in lime water for 6 hours." "These kiers have steam-tight covers, safety-valves and man-holes" (fol. 629).

5. After the pulp has been boiled enough, steam is let into the boiler upon the top of the pulp, which will bring the pressure of the steam to the top of the pulp, and force the pulp and liquor into a tub, in which it is again washed. It is then submitted to the action of muriatic or other acid—then the acid is washed out (fol. 629).

6. The pulp is then returned through a pipe to close kiers, and "*boiled in a solution of alkali* of 2°, No. 1 hydrometer," for 4 hours. It is then discharged into the washing-tub—is washed and then bleached with a solution of chloride of lime or bleaching liquor of the ordinary bleaching strength (fols. 629, 630).*

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* *Wright's manufacture of Straw Paper.*

The white paper made by Wright from straw, which was exhibited at the World's fair, was made thus:

1. The straw was cut up.

2. Boiled with caustic alkali and milk of lime, under pressure, 7 or 8 hours.

3. Beaten up in a rag-engine and washed.

4. "Boiled in caustic alkali 3 to 4 hours, without the milk of lime, under pressure, from 40 to 50 lbs."

Then washed and bleached (fol. 413, q. 103).

Brown paper was made by boiling the straw "in a high-pressure boiler with caustic alkali and milk of lime."

The only preparation of the straw was the cutting of it into lengths of one inch (fol. 410, q. 81; fol. 413, q. 103).

Mr. Wright was first examined for the defendants, and afterwards for plaintiffs, and testified as follows: Is seventy-seven years of age; is a chemist and

mechanical engineer; native of New Hampshire; in 1839 had a mill at Stockport, Cheshire county, England, for bleaching yarns, &c. (fol. 291).

In bleaching boiled the materials "in caustic alkaline solutions, under pressure from 40 to 80 lbs." (fol. 292).

Obtained a patent in England, in 1843, for bleaching fibrous substances and making them into paper (fol. 292).

Is referred to his patent calling for "high-pressure steam" in boiling straw, jute, &c., and says he had boilers made at different places—boilers that were warranted to bear 100 lbs. pressure, and supposes they would bear 200 lbs. or 300 lbs. (fols. 292, 398, 402).

First made straw-paper, under that patent, in Wales. "The next place was St. Mary's Mill, formerly St. Mary's Monastery, in Chalford, Gloucestershire county, about 15 miles from Gloucester city. It was old Friar Bacon's place" (fol. 292, q. 7).

Produces samples of white straw-paper made by that process, Exhibits N, O, P. made from straw pulp, at Chalford, about 1848. (See 2d Ex'n, Q. 93, fol. 293, corrects this. It was in 1851).

The straw from which that paper was made was boiled in caustic alkali, under steam pressure from 40 to 80 lbs. The alkaline solution was of a strength of about 8°, marked by the hydrometer in use at that time (fol. 293). On 2d Ex'n corrects this (fol. 399, q. 19), he carried 40 to 50 lbs. at Chalford (fols. 397, 398); Did boil straw at 80 lbs. at Stockport (fol. 401, q. 39).

London Exhibition.

At the Great Exhibition of the Works of Industry of all Nations, in London, in 1851, exhibited specimens of paper made by him, as before mentioned, from straw, and got the prize medal (fol. 293, q. 10), and, at the request of the British Government, exhibited similar specimens in Paris, in 1855. Produces letter containing such request from the Lords of the Committee of the Privy Council, Exhibit R. (fol. 293, q. 10).

Wright's Sale to Mellier.

When he was working his mill at St. Mary's two Frenchmen, named Muller and Mellier, visited the mill to inspect the process. Witness sold out the mill in 1845, their visit was previous to that time; witness sold his French patent to them for £6,000, but they became bankrupt and did not pay (fol. 295). Witness took out an American patent for the same invention (fol. 295).

Steam Pressure used by Wright.

Plaintiff's witness, Dr. Rand, undertakes to give an opinion that Wright's boiler would not bear 50 lbs. pressure. That opinion is of no weight against Wright's positive evidence. Wright was probably better acquainted with the use of high-pressure steam than any other man in Europe or America.

The parties who made the boilers for the mill at Chalford stated they would bear 100 lbs. (fol. 397, q. 8).

Witness used, in the manufacture of brown paper from wheat straw, at that mill, 40 to 50 lbs. pressure. States how the pressure was ascertained, viz., by a gauge on the supply boiler (fol. 397, q. 12).

As to the mode of supplying the steam to the pulping boilers (fol. 399, qs. 21 to 24).

As to witness' personal knowledge of what pressure was used—he superintended the works (fol. 399, qs. 25 to 30).

The boiling was six to eight hours (fol. 400, q. 31),

Quantity of paper made at St. Mary's Mill—it was sold (fol. 400, q. 32).

Produces samples (fol. 400, q. 35; fol. 409 q. 74).

How the caustic alkali was prepared; its strength, &c. (fol. 401, qs. 36 to 38).

Witness boiled straw in caustic alkaline solution under high-pressure steam, in his mill at Stockport—as high as 80 or 90 lbs. (fol. 401, q. 39, fol. 411).

Found such high pressure useful for bleaching purposes; states why: "I found from experience that, in using high-pressure, that the caustic alkali had a much greater effect. In boiling at 80 or 90 lbs. I found that I gained by high pressure a much greater heat, consequently the alkali acted to an advantage equal to the increase of heat" (fol. 401, q. 40).

Superintended in person the operations at St. Mary's Mill (fol. 402, q. 41).

The Stockport boilers would bear 200 lbs. pressure; describes their construction (fol. 402, q. 42).

There was no difference between the heat and pressure in the steam-boilers and the boiling-kiers (fol. 202, q. 45).

Wright's Two Stage Process—Advantages of.

Q. "If, in treating straw to make white paper, you subject the straw to a boiling at 40 lbs. pressure in caustic alkali, with milk of lime, and then wash, crush or beat the material into a pulp, and then boil that pulp a second time in a solution of caustic alkali, is there any use or benefit, in your opinion, in using in such second boiling a higher steam pressure than 40 lbs. to the inch?"

A. "I do not think there is" (fol. 403, q. 50).

Makes a much better article of white straw-paper by the two boilings at 40 lbs. (fol. 404, q. 51).

Meaning of "High Pressure Steam" in Wright's Patent.

The process for which he obtained his English patent was a success, and was so considered by the trade. Mentions paper-makers in England who used it. Refers to Mr. Cowan's letter, Feb. 7, 1846. [See Exhibit A B, and fol. 409, q. 74.] (fol. 404, q. 53–54).

Explains what he meant by the words "*high-pressure steam*," in his English patent for making paper from straw, jute, &c, says: "I meant *any pressure* that could be considered above the pressure of the atmosphere. I *had a great idea at that time of high-pressure steam*, and caustic alkali for dissolving the coloring and gummy matters contained in fibrous materials" (fol. 405, q. 55).

"Did you mean and intend, when you applied for that English patent of 1843, to use steam of high pressure in the manufacture of paper from straw, &c.; if so, how high did you consider you had the right to go under that patent?"

"I considered I had a right to go as high as I pleased—as high as the vessels would stand it" (fol. 405, q. 56).

Describes how he made the white paper and the *brown* paper at *St. Mary's Mill*—the changes of the processes described in the patent, the omission of the milk of lime treatment (fol. 409, qs. 76 to 82).

Produces sample of white paper, Exhibit A B (being letter of Mr. Cowan) manufactured in St. Mary's Mills, in the first operations there (fol. 409).

After the witness sold St. Mary's Mill, he fitted up, in 1851 or 1852, another mill at Chalford, for the manufacture of paper pulp from wheat straw. This was Spring Mill (fol. 413).

Made the *pulp* for the white straw-paper, Exhibits N, O, P, at Spring Mill, about 1851. Describes the process of making the pulp at *Spring Mill* (fol. 413, q. 103):

But the manufacture of paper from straw was discontinued by Wright. Rags were comparatively cheap in England in those days and competed successfully with straw, which required strong chemical treatment to reduce it to pulp even for a superior wrapping (brown) paper, and chemicals were dearer at that time than now, and the process now in use for restoring the alkali was not then used.

Wright's invention was somewhat premature. But the great fact remains undisputed that Wright made paper pulp from straw by boiling the straw in caustic alkali with high pressure steam, and that straw paper was made from that pulp, a little white paper and a great deal of brown paper of superior quality, 15 tons per week (fol. 410, q. 83). The manufacture was continued for seven years.

Of course when rags became dear, so that a profit could be made in the manufacture of white straw paper, it became the practice to treat straw with more alkali and heat, and restore the alkali.

Wright did not claim the discovery of the utility of high pressure with caustic alkali in the treatment of straw (for that was old), he merely describes it in connection with his apparatus.

Sales of High Pressure Boilers by Wright.

In 1839 and 1840 witness set up in France, England and Russia his patent high-pressure boilers or kiers for bleaching fibrous substances by boiling the same in caustic alkaline solutions under high-pressure. The Emperor of Russia purchased one from Wright—gave him £800 pounds for it (fol. 403).

March 20th, 1847, *French Patent to* GROS.
(*Fol.* 838.)

This is a two or three stage chemical process, for the employment of the broom plant in making paper.

The broom is crushed and the bark separated from the wood. The treatment of the bark is first described. It is crushed after being previously moistened with hot alkaline water, and during the crushing with heavy rollers, water is poured upon the matter (fol. 839). The process is continued until the material has the appearance of *oakum* (fol. 840), it is then submitted for from four to twelve hours to an alkaline solution accord-

ing to the quality of the pulp it is desired to obtain; the solution may be of "*lime* with or without the addition of *soda ash* or other alkaline solution."

The *strength of the solution of soda ash made caustic with pure lime is given for white paper.* The lye used is fifteen to twenty per cent. of the volume of water of salt of soda (sel de soude), rendered caustic with about five per cent. of quicklime. (This is 9° B or 12° Twaddell--fol. 380, q. 45.) The material is put into the solution when it is in a boiling state; after it has been boiled the substance, "without being washed and just as it is drawn from the lye, must be laid aside and heaped up to rest in this state for about a fortnight" (fol. 843).

The bleaching is then described.

The treatment of the wood freed from its bark is then prescribed. This has to be boiled under pressure *twice*, it being a refractory material.

The wood, after the operation of crushing by rollers, is "submitted to a wash (lye) in a *closed vessel, with a pressure of about three or four atmospheres* ("*avec une pression de trois ou quatre atmospheres environ*") (fols. 845, 835).

This bath (lye) must be the same as those previously described and must have the same duration viz.: eight to twelve hours (fol. 845).

Then, without being washed, it must be crushed with the rollers, until it has the looks of a textile oakum-like matter (fol. 845). After this it must be submitted to a *second* (lye) bath, *similar to the first, then well washed,*" and bleached as usual (fol. 846).*

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* Plaintiff's witness, Dr. Rand, testifies to an experiment he made with broom. He boiled the *woody* part of the broom without preparing it in any way, at about 45 lbs. pressure, for two hours, in a solution of strong caustic alkali. The result was, of course, a poor one (fol. 370, q. 63, fol. 387, q. 92, 97).

If this be presented as a test of Gros' process, it is illusory, for Gros prepared the woody part of the broom before boiling it in the caustic alkali under pressure—i. e. crushed it—then boiled it in caustic lye under pressure; then crushed it under rollers until it looked like oakum, then boiled again in lye under pressure eight to twelve hours.

Professor Rogers says that the instructions given by Gros for the preparation of the caustic alkali are clear and definite (fol. 574, q. 10).

Plaintiff's witness, Dr. Rand, infers from the direction to beat up the pulp finer than rag pulp, that "the real disintegration is effected by mechanical means, that is, the beating in the rag engine" (fol. 187, q. 40).

All pulp is beaten up in the rag engine to be made into paper (fol. 386, q. 83), Rand), and it is immaterial for the purpose of any question on this patent, whether the beating be much or little. Of course, cotton rags well softened, cannot require as much beating as harder and tougher fibrous materials, such as wood, jute, manilla, &c.

May 17*th*, 1851, *French Pat. to* COUPIER AND MELLIER.

(Fol. 934.)

Patent for "reducing vegetable fibrous materials to pulp suitable for the manufacture of white paper."

By this patent the herbs, bark and wood to be treated are exposed to the action of a solution of hydrate of soda, or potassa, of eight or ten degrees Beaumé, for ten hours, at 100 to 110 degrees centigrade (fol. 934); and the patentees say that the alkaline hydrate dissolves completely the resinous matters contained in the vegetables, and frees them from silex.

(110° centigrade is equivalent to 230° Fah.)

The process is completed by washing the material and placing it in a bath of hydrochlorate of alumina for about eight hours, where it is often stirred. This completes the disintegration and bleaches at the same time (fol. 934).

Strong Alkaline Solution.

The *alkaline liquor* is very strong-8° to 10° B. It is evaporated till it is of a thick consistency, then mixed with charcoal etc., and burnt, and the ashes render up by lixiviation almost all the alkali which has been used in the operation (fol. 934).*

* This process of restoring the alkali is used by the Am. Wood-Paper Co., and it is conceded that without it they could not afford to use the quantity of alkali necessary to reduce the wood to pulp suitable for white paper by the single stage chemical process.

Restoring the Alkali.

The alkaline liquor at this high concentration "dissolves completely the resinous matters contained in the plants, frees the silex and earthy salts, and leaves naked the fibres of the woody or ligneous parts in such a manner that they are *bleached* without any intermediate operation in a solution of hypochlorite of alumina" (fol. 935).

A second process is given by the patent more particularly applicable to the treatment of wood-shavings. It consists in the use of nitric acid to reduce the material to be treated to pulp; after the nitric acid treatment, it is boiled in caustic alkali, washed and bleached (fol. 938).

August 23, 1852, COUPIER AND MELLIER'S *English Patent.* (*Fol.* 640).

This patent is for the treatment of straw and other vegetable matter. The process commences by boiling the material in a solution of hydrate of soda or potash of considerable strength, 7° to 10° B.

The patent states that the hydrate of soda or potash is obtained by slacking a proper quantity of lime in a solution of common soda ashes or potash and drawing off the *clear liquor* (fol. 643).

The straw, &c., is put into an open tub or vessel (fol. 641), which is covered when the process is being carried on. A contrivance is described for *circulating* the boiling liquor through the material in the boiler (fol. 642).

The vegetable matter, after being boiled, is washed and bleached (the alkali is restored, fol. 643).

The patent then goes on to describe the second part of the invention, which consists in employing nitric acid to reduce wood to pulp (fol. 643).

After the treatment with acid, the materials are washed and then "subjected to the action of a solution of hydrate of soda or potash of a strength of about 2° of Beaumé, in which solution they are to be boiled for about two hours," then washed and bleached (fol. 644).

27*th September*, 1852, CENTRAL BLATTE *for the manufacture of paper in Germany.*
(*Record, fol.* 905.)

In this publication it is stated that in the manufacture of straw-paper in England, "the straw is once or more boiled in a strong lye, under a pressure of from 6 to 8 atmospheres."*

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* "Strong lye" means caustic alkali (fol. 355). A pressure of from 6 to 8 atmospheres corresponds with a temperature varying from 322° of Fah. to 347° Fah. (fol. 355).

See as to Dr. Rand's unsound criticism on this publication, page 86 of this brief.

The COUPIER AND MELLIER *American Patent.* Dated *August 2d*, 1853, for 14 years from 7th May, 1851, the date of the French patent (fol. 654).

This patent is for an "improved method of reducing fibrous vegetable substances to *pulp* fit for the purpose of making *white* paper."

The process consists

"In the treatment of straw and all crude and new *herbaceous* matters with a solution of hydrate of soda or potash of *such strength* and in such manner as will, together with the other means hereinafter described, reduce them to pulp, and thereby *dispensing almost entirely with machinery* as *commonly employed* for similar purposes." (*fol.* 654.)

"This process is simple, efficacious and economical, but the *success depends entirely on the strength of the liquor* employed, and the *purity* of the hydrate of soda or potash, for we have discovered that usually, in attempts hitherto made to obtain *pulp* from such materials, and to *bleach* the same, *the failure has been in part owing to the presence of lime* (a very common occurrence) in the solution of soda and potash; where lime is present the pulp will always retain a *yellowish* or dingy color" (*fol.* 654).

The straw, &c., is boiled in the alkaline solution "and it is important that the solution should be of *considerable strength.*" 8° to 10° Beaumé is recommended.

There is a contrivance in the boiling-tub for forcing the alkaline liquor through the material (*fol* 655).

Strong bleaching liquor is used, viz.: 3° Beaumé (*fol.* 657).

The *alkaline* liquor, being very strong, is evaporated and the resultant product is used again (*fol.* 658).

Note.—Under this patent large quantities of white straw-paper were made in the United States.

The Coupier and Mellier French patent calls for a boiling of the straw in caustic alkali under pressure (*fol.* 934).

The Mellier patent calls for a higher pressure and a weaker alkaline solution, and a weaker bleaching liquor.

Cunningham's English Patent of 1794, calls for clarified caustic alkali.

WATT AND BURGESS' *English Patent*, 27*th October*, 1853.
(*Record, fol.* 908.)

19th August, 1853, Provisional Specification filed 27th October, 1853.

27th Oct., 1853. Patent sealed.

18th February, 1854, Final Specification filed.

The *Provisional Specification* is as follows:

"This invention has for its object better means than those at present practiced for disintegrating and pulping vegetable substances for the manufacture of paper and other fabrics, for which purpose we take, for instance, chips, shavings of wood or sawdust, and boil for some hours in water. A stream of sulphurous acid is passed through the mass till a partial bleaching is effected. The matters are then well washed and placed in solution of chlorine, chloric or chlorous acid, called also the peroxide and protoxide of chlorine. The matters are kept in the solution till quite white, and the fibres are disintegrated. Or we employ chloride of sodium, decomposed by electric agency. After the above treatment, we heat the fibrous mass in a *warm* and *dilute* solution of caustic soda or potash."*

* It will thus be seen that the *provisional specification* was for a process whereby the wood, after having been boiled in water, is to be treated with sulphurous acid until a partial bleaching is effected, then treated with chlorine until

The *final specification* filed in the Great Seal Patent Office, 18th February, 1854, is for a totally *different invention.*

After copying the Provisional Specification as above, it continues thus:

"Having thus stated the nature of our said invention, we will proceed to describe *the manner of performing the same.*"

Here follows specification of a different process, thus:

1st. The wood, &c., to be reduced to shavings, or cuttings.

2d. Boiled in solution of caustic alkali, the strength of which is dependent upon the vegetable substance operated on. So the length of time for the boiling. "For deal or fir wood we find that a solution of alkali, of the strength indicated by 12° of the English hydrometer, answers very well."

"We find boiling in a solution of caustic alkali, under pressure, of considerable service." "We do not claim this operation as a part of our invention."

3d. The shavings are to be washed, the liquor saved, evaporated and "burned in a suitable furnace, when they are again available for the same purpose."

This is what is directed in Coupier & Mellier's Patent, ante, page 24.

4th. "The damp shavings are now to be exposed to the action of chlorine, or the compounds of chlorine with oxygen, till, on a portion being placed in a dilute solution of caustic alkali, the vegetable material falls into a dark, pulpy mass."

This part of the process is conveniently effected by placing the damp shavings on racks or drawers.

5th. The shavings are washed and placed in a weak solution of caustic alkali.

6th. Washed and bleached by the usual process.

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the fibres are disintegrated. Then a *warm and dilute* solution of caustic soda is applied.

Contrast this with the process prescribed in the final specification. Here we have no sulphurous acid treatment, but, on the contrary, begin with a boiling in *strong caustic* alkali; secondly, chlorine is applied; thirdly, a weak solution of caustic alkali.

"In the above process we do not confine ourselves to the particular apparatus or utensils herein claimed, but claim the use of chemical processes, and in *order* herein stated."*

WATT AND BURGESS' *French Patent*, 28*th September*, 1853.
(*Record, fol.* 920.)

It differs somewhat from the final specification of the English Patent.

No reference is made to boiling under pressure.

No definite degree of strength is suggested for the alkaline solution.

The directions are as follows:

1. The wood, &c., is to be well divided up.

2. "The chips, cut straw, &c., are then boiled in a bath of an alkaline solution."

"If pine or fir wood is used, the alkaline solution should be stronger."

"This solution should be of sufficient strength to divest the wood of resinous matters."

3. "The woody matter is then washed and put in a chloride solution." (This is instead of No. 4, as above, in the English Patent.)

4. It is then washed, and "sprinkled with a solution of warm caustic alkali."

5. Washed and bleached.

WATT AND BURGESS' *American Patent*, 18*th February*, 1854.
(*Fols.* 577 to 582.)

Antedated to 19th August, 1853; date of the filing of the Provisional Specification of the English Patent.

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* Watt and Burgess have not advanced any legal claims in England under their patent there (fol. 236, q. 152; fol. 970, q. 8).

Wood-paper pulp is made in England by other processes (fol. 237, q. 153). Large quantities of paper are made in England from straw and esparto grass by boiling it in caustic alkali under pressure (fol. 971).

It is a copy of the final specification of the English Patent, omitting the whole of the first part of it which recites the *provisional* specification.

On the application for this patent (which was at first refused) the argument in support of the application was that the "invention relates to a series or combination of processes in *the order* in which they are stated," viz.:

1. Boiling in caustic alkali (*nothing said about pressure*).
2. Applying chlorine.
3. Application of caustic alkali.

"The shavings pass through these several processes, and this constitutes the invention."

"It is admitted that alkali and chlorine have been used in "pulping vegetable matter, but it is not known that *alkali*, "*chlorine*, oxygen and *alkali*, have been used *in the manner* and "*in the order* in which Messrs. Watt & Burgess use them."

"This order and series of processes is what, therefore, con- "stitute their invention."

The claim of the patent is for "the pulping and disintegrat- "ing of shavings of wood and other similar vegetable matter "for making paper, by treating them with caustic alkali, "chlorine simple, or its compound, with oxygen and alkali, *in* "*the order* substantially as described."

The Commissioner of Patents decided that the patent should be granted.

He says (fol. 438):

"Can it be possible that a pine plank can be formed into a ream of paper, without including a patentable discovery in the process by which that end is attained?"

"In the case of making paper from wood, if the present applicant cannot obtain the patent, no one can. This would, of itself, seem sufficient reason for granting the patent."

The Commissioner, Mr. Mason, was entirely unaware of the existence of the early patents which have been put in evidence in this case.

And this question is put to the Examiner:

"Would this in substance meet your approval for a claim for A. Mellier's process?"

That seems to explain the peculiar phraseology of the claim, as finally allowed, and its narrowness.

White Straw Paper made in the United States before Mellier's Patent.

White paper had been made from straw, under the process of Coupier & Mellier's patent of August 2, 1853. The Philadelphia *Ledger* and the N. Y. *Daily Times* were printed on paper made in this manner. (Fol. 459).

The claim was, that Mellier's new improvement *cheapened* the process—that was all.

The Am. Wood Paper Co. did not purchase the Coupier & Mellier patent—it has expired.

1858, 3*d August*, LYMAN'S *Patent*.
(Record, fol. 787.)

This patent is chiefly for a method of disintegrating any vegetable fibrous substance, by subjecting it to the action of steam in a closed cylinder (called a steam-gun), and then causing it to be projected from such cylinder into the atmosphere, whereby the tubes forming the fibrous material are, by the expansive force of the steam acting within them, burst open, and the whole mass converted into fibre (fol. 789).

The apparatus for this process is fully specified, and a steam pressure of about 180 lbs. to the inch is prescribed when treating pine wood (fol. 791).*

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* This is what plaintiffs' witness, Rand, calls a mechanical process.

He says he is "of the opinion that this operation is almost entirely mechanical, and is chiefly a division of the bamboo preliminary to the subsequent chemical operations" (fol. 170, q. 8, p. 174, q. 17).

It was observed by plaintiffs' counsel, in arguing another point in the Court, below—(Printed Argument, p. 51), "We call heat a chemical agent, because it increases the action of chemicals. I would not exclude it from the category of chemicals."

With steam in the gun at a pressure of 180 lbs. to the inch, when the explosion from the gun takes place, the explosion of the steam in the material may be com-

pared to the explosion of millions of little boilers. The material is disintegrated, the gummy and resinous matters holding the fibres together are made *soluble* and the fibre thus prepared, if beaten up in water, is reduced to coarse pulp.

Chips of wood and wood shavings cannot be reduced to pulp by being beaten up in water in a rag engine.

See full description of defendants' process in defendants' answer, (Record fols. 116, 117).

Plaintiff's counsel, Mr. Jenckes, refers to Lyman's patent, and says: (printed argument, p. 12), "What did Mr. Lyman think he did? Why, that he obtained "pulp from wood. His is an invention for making pulp or machine for disinte- "grating the fibres of wood, so that they can be separated so perfectly that they "can be wrought into paper. He acted under that delusion; and those who "followed his patent sunk some thousands and hundreds of thousands of dollars "in attempting to carry it out, until, at last, those gentlemen found that they had "to put their pulpy mass into caustic alkali, and in that way extract the fibre,— "copying the process of the complainants."

Mr. Jenckes might as well have said that Lyman thought he made cloth from flax-straw by the steam blowing process without anything more.

There is not a scrap of testimony to sustain Mr. Jenckes's assertion.

The steam blowing process is used for the purpose of disintegrating the bamboo, reeds, etc., so that the acid, intercellular matter, etc., may be *washed out prior to the application of caustic alkali*, when paper of good quality is to be made. And thereby a great saving is effected.

The Process under this Patent.

The plaintiffs' process is very inferior. See Townsend's testimony, fols. 286, 287, showing that if the plaintiffs instead, of putting wood chips into their boilers, should put the steam-blown material washed, dried and pressed, they would save two-thirds of the alkali—would not require over 40 lbs. pressure (instead of 160 lbs.), and would get 5 tons into a boiler, which would not shrink over 30 per cent.

The plaintiffs get only about one-third of one ton of pulp from a boiler filled with wood chips. Under the plaintiffs' process, they put a ton of wood chips into a boiler to be boiled with very strong caustic alkali, using ¾ of a pound of soda to produce 1 lb. of paper pulp (Record, fols. 371, 372.)

The ton shrinks to one-third of a ton; the alkali is to a great extent neutralized by the acid in the wood, a great degree of heat and an alkaline solution of tremendous strength is required. This expense the plaintiffs are able to bear, because they use a process for restoring the alkali—not a patented process, but an old, well-known process of evaporation and incineration. (See fol. 935.)

The plaintiffs accomplish by sheer strength, at a single effort, what should be effected by successive and more economical processes. See the defendants' Exhibit B, as a specimen of steam-blown bamboo washed with water.

It is evident that this is a better material to treat than chips of wood can be. See also Exhibit K, steam-blown bamboo washed in beating-engine.

SYNOPSIS OF THE CASE.

Review of the several cases decided in the courts below.

See *analysis* of the Mellier patent, with remarks on the correspondence with the Patent Office, on the application for the patent (pages 30 to 32 of this brief).

The advantages resulting from the use of high steam pressure are alleged in the specification to be a diminution of the quantity of caustic soda required to reduce the straw to pulp, and the use of a comparatively small quantity of chloride of lime or other bleaching agent to bleach that pulp.

There is no evidence in the present case shewing the effect of the process prescribed by the Mellier patent—no proof of any operations according to that process. The absence of such evidence is owing to the fact that the contestation was solely upon the Watt & Burgess patents—the plaintiffs' witnesses having treated the Mellier patent as confined to straw, and the plantiffs' counsel having so treated it, even on the opening of the argument.

There are three elements combined in the process prescribed by the patent:

1. The use of steam pressure of at least 70 pounds.

2. The use of *pure* caustic soda.

3. The use of a weak solution, viz., 2° to 3° B.

It is alleged that the pulp will then be bleachable with a weak solution of chloride of lime, viz., from 1 to 1½ degrees.

As to the third direction, it is to be observed that some parties have always preferred to use a strong solution, because the alkali can then be restored, and when the strong solution is used the high pressure called for by the Mellier Patent may be reduced.

It is not pretended that there was any novelty in the use of pure caustic soda. The claim of novelty rests upon the supposed novelty of the combination of the three directions above specified—upon the supposed discovery that a combination of the prescribed heat with the prescribed quantity of caustic alkali, in solution, pure and free from lime, would be sufficient to reduce the straw to a bleachable pulp, *i. e.*, bleachable with the prescribed strength of bleaching liquor.

There is no proof in this case that the prescribed combination will produce the result claimed for it, but there is proof to the contrary.

(See Point 15.)

The first claim of the patent relates to a particular form of boiler, but that has not been found to be practically useful.

High pressure boiling not new.

The defendants have put in evidence various patents and publications, from which it appears that the boiling of fibrous vegetable substances in a caustic alkaline solution, under pressure, to reduce them to paper pulp, was not new at the date of the Mellier patent.

See abstract of these patents, pages 11 to 30 of this brief, and especially the following patents :

Patent to Montgolfier, in 1838, for a process of making pulp from wood, which consisted in boiling in an alkaline lye, at high pressure.

Wise's French patent, obtained in 1838, for a rotary boiler for boiling vegetable fibrous substances in caustic lye, under pressure, to make paper pulp.

Legoux's French patent, obtained in 1839, for a process of making paper pulp from wood (similar to Montgolfier's), the wood being boiled under a pressure of three or four atmospheres.

Wright's English patent, obtained in 1843, for making paper from straw, etc., by boiling in alkali under high steam-pressure.

The French Patent to Gros, in 1847, for making paper pulp from the broom plant, by boiling in alkali, under a pressure of about three or four atmospheres.

In 1852 a German scientific publication contained the announcement that in England, in the manufacture of paper from straw, the straw was boiled in a strong lye under a pressure of from six to eight atmospheres (fol. 905).

Mellier's real claim.

Mellier knew very well that there was no novelty in the boiling of straw in caustic alkali at a high pressure, and therefore he confined his claims to a process consisting of the observance of—

1. The preliminary preparation of the straw as described.

2. The use of a weak solution of caustic alkali—strength 2° to 3° B—(pure caustic soda).

3. A boiling at not less than seventy pounds pressure. That is to be for three hours, by which process the pulp is bleachable with a weak solution of chloride of lime, viz., of the strength of 1 to 1½°.

There is no proof in this case that a pound of good bleachable pulp was ever made by following these directions.

Rise of the Manufacture.

It was not until several years had elapsed after the issue of the patent that the manufacture of white paper from straw rose into importance, by reason of the high price of rags.

The scarcity of cotton rags caused by the rebellion gave a great stimulus to the manufacture.

The Litigations—Judge Hall's decision:

In March, 1863, the assignee of Mellier's patent obtained a decree in the Circuit Court for the Northern District of New York against Howland & Palser, for infringement.

They used 130 lbs., which is a much higher pressure than the highest called for by Mellier's patent (viz., 84 lbs.); they also used a stronger alkaline solution, and a longer boiling (fols 56, 57).

The Judge (Hall) supposed (see his opinion, Record, fol. 51) that Mellier had discovered that "*pure* caustic soda, *which had been previously* advantageously used, by boiling straw and other fibrous materials of similar character and texture *in open vessels, in which the heat could be raised only to* 212° Fah., might, by the use of a much higher degree of heat, not less than 310° F., be advantageously and greatly increased," *i. e.*, a weaker solution could be used, and time could be saved in the boiling.

The foreign patents and foreign publications in evidence in this case, were not in evidence before Judge Hall. From these patents and publications it appears that there was no novelty in the process of boiling straw, &c., in caustic alkaline solutions in close boilers under high steam-pressure, although it was generally preferred to *prepare* the straw, &c., by cheap chemical and mechanical treatment, so as to reduce it to cleansed pulp before putting it in a close boiler to be treated with that expensive chemical, caustic alkali.

The various criticisms of plaintiff's witness, Dr. Rand, upon those patents, may be summarily disposed of. We readily admit that none of them call for the exact *combination* called for by the Mellier patent, but they clearly show that the elements of that combination are destitute of novelty in the art of reducing vegetable fibrous substances to paper pulp by boiling them in a solution of caustic alkali under pressure.

Judge Hall says, referring to the use of the Spofford rotary boiler, that, although pressures above 70 lbs. had been carried in them, "the extraordinary degree of heat used was not regularly and uniformly attained and kept up, but was rather *casual* and *incidental*" (fol. 54).

In the present case the proof is clear and uncontradicted, that the Spofford boiler was used in the United States in 1853, at 60 lbs. pressure, to reduce to paper pulp shives and coarse tow and the seeds in cotton-waste—not casually, but because that pressure was found to be useful for that purpose (fol. 324, q. 69).

There is, moreover, an abundance of other evidence that

high-pressure boiling had previously been "found to be useful" in Europe. And see the Watt and Burgess patents.

Judge Hall says, "Until the defendants, in 1857, entered upon its use, the open tub process of Coupier and Mellier was still in general use when white paper was attempted to be manufactured from straw" (fol. 55).

Judge Hall had not before him Coupier and Mellier's *French* patent, dated May 7th, 1851, which requires the material to be boiled in an alkaline solution at "the temperature of 110° centigrade."

That is 232.5° Fah., which is several lbs. steam pressure.

Watt and Burgess's reissued Patents.

On 7th April, 1863, a reissue was obtained of the patent granted July 18th, 1854, to Messrs. *Watt & Burgess*, natives of England, which original patent was for a process of manufacturing paper pulp from wood by a *tri-stage* chemical process consisting of the use, 1st, of caustic alkali, then of chlorine, and *then of caustic alkali again;* the first treatment with alkali being a boiling of the wood, either in an *open tub* or in a close boiler under steam-pressure.

By the reissue in 1863, the original patent was *expanded* so as to cover a boiling of *any* fibrous vegetable substance in *any* solution of caustic alkali at *any* temperature "at, *near* or above 300°," and the tri-stage process was abandoned.

This appears to have been done to cut out the Mellier patent.

The original Watt & Burgess American patent of 1854, was antedated to 19th August, 1853, the date of the provisional specification of an English patent, and it is, therefore, of an earlier date than Mellier's patent issued by the United States 26th May, 1857, antedated to 7th August, 1854, the date of a French patent for the same invention.

Mr. Burgess, one of the patentees of the Watt & Burgess patent, and a witness for the plaintiff in this cause, testifies that, having in his original American patent of 1854, referred to a boiling under pressure as being useful, he considered that

he had the right to boil at *any pressure* (fol. 233, q. 144). In that way he explains and defends the expansion of his patent in the reissue.

Watt and Burgess have not advanced any legal claims in England under their patent there (fol. 236, q. 152; fol. 970, q. 8).

Wood-paper pulp is made in England by other processes (fol. 237, q. 153). Large quantities of paper are made in England from straw and esparto grass by boiling it in caustic alkali under pressure (fol. 971).

Decision of Judges Grier and Cadwallader on the Mellier and Watt and Burgess Patents.

The Watt & Burgess reissued patents were assigned 18th May, 1863, to the American Wood Paper Co., and to Mr. Buffum, their trustee (fol. 30).

Then the American Wood Paper Co. purchased the Mellier patent, taking an assignment to their trustee 14th Oct., 1863 (fol. 68).

The American Wood Paper Co. thus having the two patents, brought suits upon them, embracing both in one suit, and in those suits insisted that the Mellier patent calling for at least 70 lbs. steam-pressure meant $55\frac{3}{10}$ lbs. by the gauge. And moreover, that the patent covered any boiling of any fibrous vegetable material in any solution of caustic alkali under steam-pressure of any degree for the purpose of making paper pulp *by one single operation.*

They brought a suit against Heft & Co., of Philadelphia, who used a *single stage* process, boiling in caustic alkali at a pressure not exceeding 60 lbs., and against *The Fibre Disintegrating Co.*, who used a *compound* process, viz., a boiling in an alkaline solution at a pressure from 40 to 60 lbs., after having reduced the fibrous material to a cleansed *pulp* by other chemical and mechanical means.

In the *Heft* case, before Judges Grier and Cadwallader, upon the production of early French and English patents, specifying a boiling in a caustic alkaline solution under high steam-pressure, the plaintiffs called experts who drew this *distinction*, viz., that Mellier made the pulp at *one operation*, whereas others

who preceded him and used high-pressure (how high in some of the cases does not appear) effected the pulping by other means, in addition to the high-pressure boiling.

The Mellier patent was claimed to be a patent for a *single operation*, and, accordingly, it is insisted that those who use but a single operation with caustic alkali and high-pressure steam, infringe the patent.

Then, when it was shown by foreign publications that there was no novelty in the single stage process—a printed publication being produced, showing that straw had been commonly pulped in England by boiling it in caustic alkali, under a pressure of 6 to 8 atmospheres—that was met by the argument that it was not shown that the precise *strength of alkaline solution* called for by the Mellier patent had been used, nor that pure caustic soda had been used.

That brought down the patent to a mere combination.

It will be observed that Mellier's *specification* does not define what is meant by "pure caustic soda." The expression occurs for the first time in the claim.

In the Heft case, the plaintiffs' bill was dismissed: Judge Grier holding (1) that the patent meant 70 lbs. pressure, as shown by the gauge; (2) that high pressure boiling was not new with Mellier.

This case is reported 3 Fisher, 316.

Decision of Judge Benedict on compound processes.

But in the suit against the Fibre Disintegrating Company, before Judge Benedict, where a *compound process* was used, and the defendants made pulp from bamboo, which could not be reduced to pulp at all of any kind, by a boiling, at 70 lbs. gauge pressure in a caustic alkaline solution of 2° to 3° B, Judge Benedict held that defendants had no right to boil in any alkaline solution (however weak), if below 3° B, with steam pressure of 56 lbs. (or even less), although the material used by them was a *pulp* made by the steam-blowing process, followed by a boiling in a weak alkaline solution, and a mechanical action, before the boiling in caustic alkali in a close boiler.

Thus the patent was treated as if it was simply for high-pressure boiling, *about* as high or higher than 56 lbs. to the inch, and all that had been said about the novelty of the single stage process was dropped.

This case is reported 3 Fisher, 362.

Difference between Judges Hall, Benedict and Cadwallader:

Judge Hall's opinion is different from that of Judge Cadwallader and from that of Judge Benedict, in the following particulars:

Judge Hall holds—

1. That there must be 70 lbs. pressure, as shown by the gauge.

2. That the alkaline solution must be that specified in the patent, viz., between 2° and 3° B.

He does not found his decision, as Judge Cadwallader does, on the assumed fact that Mellier discovered a *single stage* process, but places it upon the ground that Mellier was the first to use steam pressure of any degree in a pulping process.

Opinion of Judge Woodruff.

The American Wood Paper Co. vs. *The Glens Falls Paper Co.* 4 *Fisher*, 324, 8 *Blatchford*, 514 (decided in 1871). In this case, Judge Woodruff held that the defendants infringed the Mellier Patent, and granted an injunction restraining them from using the process which they were then using "or any process substantially the same."

The suit was brought on the Watt and Burgess Patents, as well as on the Mellier Patent. Judge Woodruff held that it was not necessary to give any opinion on the Watt and Burgess Patents, but gave a general decree in favor of the plaintiffs for costs.

It is impossible to ascertain from Judge Woodruff's opinion, what he considers to be an infringement of the Mellier Patent. He says (p. 325), that he cannot devote much time to writing an opinion. He does not state what he considers to be the *limits* of Mellier's Patent, nor indeed what the patent is for. Nor does he state what process the defendants used which he decides to be an infringement.

All that can be learned from the Judge's opinion is, that he considers Mellier was the "first to bring into practical use the "art of converting *woody* substances into *useful* pulp for the "manufacture of paper, in a manner *convenient* and *economical*."

As to that, it is to be observed that he never pretended to treat "*woody*" substances at all, and that there is not even the slightest ground or pretence for saying that Mellier was or ever claimed to be the first to make "*useful*" pulp even from straw. The manufacture of useful straw paper of various grades is confessedly old.

The question is, what kind of pulp does Mellier's Patent relate to, and what, if any, is the novelty described by him in its manufacture.

It will not do to say that it is a Patent for the manufacture of "*useful pulp*" "*in a manner convenient and economical*," and then to say, when it is shown that another method is used different from that described by Mellier, and combining elements of processes as old as the hills, and nothing that was invented by Mellier, that it is an infringement of his Patent, because a "useful pulp" is produced in a convenient and economical manner!

Suppose, for example, any manufacturer should avail himself of the directions of Montgolfier, Wright or Gros, and make a pulp by either of their methods, could it be claimed that such manufacture would be an infringement of Mellier's Patent, because the pulp was made in a manner sufficiently convenient and economical to satisfy the manufacturer, and yield him a profit?

It is evident that no such generalization is admissible. The Patent is not, and is not claimed to be for the general effect or result referred to by Judge Woodruff.

Judge Woodruff's argument appears to be that any process by which a good result is obtained is necessarily founded on and taken from Mellier's specification, as if it were a new thing to boil fibrous substances in caustic alkali under pressure.

But the Judge's remarks are so vague and general, that it is impossible to say whether he considers everybody to be an in-

fringer who boils "woody substances," or straw or any other fibrous material in an alkali of any kind under any degree of pressure. In fact, he says nothing about any degree of pressure or alkali of any kind, quality or strength.

He says that he concurs with Judge Hall in his opinion that the Patent does not define a minimum temperature to be used.

That is not Judge Hall's opinion. On the contrary, he holds that there is no infringement unless at least 70 lbs. pressure is used—also holding that the Patent does not limit a maximum.

He says, "While the minimum heat requisite to produce a really beneficial result was stated no upward limit was fixed." (See Record, fol. 52.)

We understand the fact to be, that the Glens Falls Paper Co. made pulp for white paper by a single stage process.

They boiled the straw in a solution of pure caustic soda at a pressure of 50 lbs., preferring a long boiling (nine hours) at that low pressure, as they thereby prevented a waste of the material.

They bleached by what is called the Hydrostatic process, and the pulp made was not bleachable by the method and with the strength of bleaching liquor described by Mellier's Patent.

Judge Woodruff held this to be an infringement of Mellier's Patent. He considers that "the liability for infringement is not to be avoided by abating a *trifling* degree of heat, extending the process a *fraction* of time," etc. And the reduction of the heat and pressure "from at least 70 lbs." to 50 lbs., and extending the boiling from three hours to nine hours, he treats as an abatement of a trifling degree of heat, and an extension of the process a fraction of time only!

One of the chief questions for this Court to decide is, whether the Patent is to be construed as a Patent without limitation, conferring the exclusive right to boil any fibrous material in caustic alkali under steam pressure; without regard to the degree of pressure, or the kind, quality or strength, of the alkaline solution.

That is what the plaintiffs' counsel now contend for, and that claim has been virtually sustained by the opinions of Judges Cadwallader and Woodruff, partially rejected by Judge Benedict, and pronounced to be wholly untenable by Judge Grier.

Mellier himself never set up such extravagant pretensions in France or England as are now advanced by his assignees in the United States.

In neither France nor England has he ever been recognized as the great discoverer and inventor which Judges Hall, Woodruff and Cadwallader supposed him to be.

On the contrary, he and his patent have been entirely ignored in England and France.

THE VARIOUS STAGES OF THE EXPANSIONS OR METAMORPHOSES OF THE PLAINTIFFS' CLAIMS UPON THE MELLIER PATENT.

At first it was claimed to be a Patent for the use of at *least* 70 to 84 lbs. pressure, as shown by the gauge, in boiling *straw* in a solution of *pure* caustic alkali of a *strength* of 2° to 3° B; whereby it was alleged the pulp would be *bleachable* by the application of bleaching liquor of the strength of 1° to $1\frac{1}{2}$°.

As to the Pressure.

Then it was stretched from time to time, as to the pressure to be used in conjunction with the prescribed alkaline solution, as follows:

1. So as to give a monopoly of the use of any temperature at or above 310° Fahrenheit, although the pressure used may be less than 70 lbs. or more than 84 lbs.

2. Further stretched, so as to reduce the 70 lbs. to $55\frac{3}{16}$ lbs. by the guage.

3. Further stretched so as to disregard the limit of a *minimum* temperature altogether. It was then said that the Patent was infringed by the use of *about* 310° Fahrenheit.

4. Further stretched so as to give the exclusive right to boil "under pressure" of any degree.

As to the Alkali.

Then we have a series of expansions to get rid of the qualification as to the strength and quality of the alkaline solution to be used in combination with the specified temperature.

1. We are told that the use of an alkaline solution *weaker* than that called for is an infringement.

2. That the use of an alkaline solution *stronger* than that called for (even four times as strong), is an infringement.

3. That the use of a solution of caustic soda *not pure*, is an infringement, and that the fact that the paper made is of poor quality, aggravates the offence by casting discredit on "the Mellier process."

As to the Material.

Then we have the Patent further stretched, so as to monopolize the right of making pulp from *wood* or any kind of fibrous vegetable material, by boiling in caustic alkali under pressure, with a weak or strong solution, with high or low pressure, for a short or a long time; and that whether the pulp is bleachable or not, by the use of bleaching liquor of the strength defined in the Patent, and even if it be not bleachable at all by the bleaching process called for by the Patent.

As to the Process generally.

At one time we have the theory advanced by plaintiffs' counsel, that the Patent stands unaffected by prior Patents, calling for boiling with caustic alkali under pressure, because they required other things to be done, in fact were Patents for compound processes, whereas the Mellier Patent is for a single stage chemical process. Then, when a party using such compound process is sued, that theory is repudiated.

These various claims are varied from time to time, so as to meet the exigency of each case as it is presented, thus making the Patent a monopoly of the right to boil in caustic alkali, under pressure, in the face of the clear evidence that there was no novelty in that.

THE WATT AND BURGESS PATENTS.

On 19th August, 1853, Watt & Burgess filed in the Patent Office in England, a provisional specification for a process of making paper pulp, chiefly by the use of *sulphurous acid* followed by chlorine.

On 18th February, 1854, they filed a final specification for a process, consisting of boiling shavings of wood, &c., in a caustic alkaline solution, then treating the shavings with chlorine (see analysis of this English patent, page 26 of this Brief).

(This patent is void under the English Law, on account of discrepancy between the provisional and final specifications.)

July 18, 1854, Watt & Burgess obtained a patent in the United States to run from 19th August, 1853 (see analysis of this patent, page 28 of this Brief).

The specification is similar to the final specification in the English patent above referred to.

Oct. 5, 1858. This patent was re-issued by assignees of the patentees (see analysis of this patent, page 28 of this Brief).

On 7*th April*, 1863, the last patent was surrendered, and two patents were re-issued in lieu thereof; one for a process, the other for a product (see analysis of these re-issues, page of this Brief).

Point I.

VARIANCE FROM ORIGINAL SPECIFICATION.

The original Watt & Burgess American Patent of 1854, was invalid, because it was not for the same invention as that described in the English *provisional* specification, filed 19 August, 1853, to which date the American patent has relation.

The same objection applies with even greater force to the re-issued patents of 1863.

19th August, 1853, Provisional Specification filed.
27th October, 1853, the patent sealed.
18th February, 1854, the detailed Specification filed.

See abstract of the English patent, ante, page 26, showing the discrepancy between the provisional and final specification.

An English patent is granted upon the condition that if the patentee shall not *particularly* describe and ascertain the nature of the invention, and in what manner the same is to be prepared, by an instrument in writing, under his hand and seal, and cause the same to be filed in the great seal office, within six months after the date of the patent, it is to be void.

See the remarks of Chief Justice Taney on the difference between the English and American patent systems in this respect. *Morse* v. *O'Rielley*, 15 *How., on page* 108. In England the *patent precedes* the complete specification, while in the United States they go together.

The English patent was granted 27th Oct., 1853, and the *final specification* filed 18th Feb., 1854, recites the *previous granting* of the patent, which patent was for the invention described in the petition and provisional specification.

This final specification is not for the invention described in

the provisional specification, and the English patent is for that reason, under the decisions in England, void.*

The process described in this final specification is not the process described in the petition and provisional specification.

After going through the farce of copying the provisional specification, the final specification proceeds to describe the invention.

The very first step of the process described in the provisional specification, the use of sulphurous acid, is dropped altogether; and instead of relying upon the action of sulphurous acid, followed by chlorine to *bleach and disintegrate* the fibres, and *then* applying a *warm* and *dilute* solution of caustic soda or potash to complete the process, the patentees proceed to describe the following process as their invention: 1st. The wood shavings, &c., are to be "*boiled* in a solution of caustic alkali" of *enormous strength*. 2d. Chlorine is applied. 3d. A *weak* solution of caustic alkali.

It thus appears that between the 19th August, 1853, and 18th Feb., 1854, Messrs. Watt & Burgess entirely changed their pro-

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Invalidity of the English Patent.

* *Byrne on Patents* (London, 1860), page 33: "The title is the general description of the invention given in the petition and in the provisional specification. Its importance arises from its being *the foundation* of the patent. The patent is granted in exact accordance with the description of the invention contained in the petition, and in the *provisional specification*. The *complete specification* of which we are about to treat must correspond with it, for if one thing be claimed by the patent and another by the specification, the patent is void. *Harmar* v. *Playne*, 11 *East*, 101; *Bovill* v. *Moore*, 2 *March*, 211; *Brunton* v. *Hawkes*, 4 *B. and Ald.*, 541; *Champion* v. *Benyon*, 6 *Moore*, 71; *Bloxham* v. *Elsee*, 6 *B. & C.*, 169.

The title of the invention should clearly and definitely express what the invention is.

In one case, the description was "for a tapering brush." But the specification disclosed a brush in which, although the hairs were of equal length, there was no tapering point. (*Rex* v. *Metcalf*, 2 *Stark R.*, 249.) And such also was the decision in another case, where the title was for "a new improved method of drying and preparing malt"—the invention really being a process of producing coloring matter for beer, by submitting malt prepared in the ordinary manner to a high degree of temperature. (*Rex* v. *Wheeler*, 2 *B. & Ald.*, 349.) And where the patent was "for an improved method of lighting cities, towns and villages," but the invention appeared to be only an improvement of the old street lamp. (*Cochrane* v. *Smethurst*, 1 *Stark*, 205); the patent was held to be void."

posed process, but probably not being willing to lose the fees paid on the provisional specification, or *desiring to date back their claim* of invention to the 19th August, 1853, to cut out other inventors, they filed the final specification in question.

As the invention described in that provisional specification is not the same as that described in the American patent of July 18, 1854, the antedating to 19th August, 1853, is fatal to the American patent.

The authority of the Commissioner of Patents to antedate a patent is given by the Act of 1839, sec. 6, which directs the patent to be limited to the term of fourteen years from the date or publication of the foreign letters patent, for *the same invention* or discovery.

It was a fraud to represent that the English patent was for the same invention as that described in the American specification, and thus to get the benefit of *the antedating* to the 19th August, 1853, and of the legal presumption that the invention described in the patent of 1854 was invented as early as 19th August, 1853, so as to cut out intervening patents, &c.

Comparing the re-issued patents of 1863 with the English specification of 19th August, 1853, it is most manifest that they are not for the same invention.

The process described in the 1st claim of the reissued patent of 1863 is to be applied to every kind of vegetable fibrous substance, except "resinous woods," and in that process there is to be no disintegration by sulphurous acid, nor by chlorine; on the contrary, the disintegration is to be effected by the sole agency of caustic alkali and high-pressure boiling.

As to the 2d claim, respecting a process for "resinous woods," it would be immaterial, even if it referred to a process like that of the original specification; the fact would remain that the patent is, as to the part covered by the 1st claim, a patent for an invention not described in the provisional specification.

The English patent is void because the first specification is for an invention different from that afterwards described.

And the American patent is void because it relates back to the first English specification, and falsely claims to be for the invention therein described.

Point 2.

THE ORIGINAL PATENT—CONCEALMENT.

The original patent of 1854 was invalid on account of the concealment of the alleged discovery or invention of the patentees set forth in the reissued patents.

In the original American patent of 1854, the public are instructed that the process could be performed by a boiling in an open tub.

And now the re-issued patent asserts that a boiling under pressure near 300° Fahrenheit is essential.

Either the patentees had not discovered the necessity of that boiling under pressure or they concealed their discovery.

In either case the patent is void.

In the Philadelphia case Judge Cadwallader enquired whether, in a moral point of view, it was right for the patentees to refer to and claim boiling in a tub, if they knew that a high pressure was necessary to effect the desired object.

Burgess is asked why, in the specification of the patent of 1854, he did not state that non-resinous woods required boiling at a temperature of 366° (fol. 235, q. 150), and merely answers that he was ignorant of patent matters and *did not know that anybody had ever used alkaline boiling under any pressure for the purposes of disintegrating vegetable substances.*

Judge Cadwallader, in his opinion in the Heft case, speaks of "the immense improbability that they had, in fact, invented or discovered the process" when they got patent of 1854.

(See a reference to the authorities supporting this objection, page 67 of this brief.)

Point 3.

REISSUE—DEFECTIVE ALLEGATION.

The reissued patents of 1863 are invalid, the allegations required by the Statute to authorize such reissue not having been made.

The affidavits were merely that the assignees of the patent believed "that by reason of an insufficient or defective specification the aforesaid patent is not fully valid and available to them" (Record, fols. 738, 739).

In *Whitely* vs. *Swayne*, 4 *Fisher*, 124, just such an affidavit was held to be insufficient, and the reissued patent declared void. In that case, the applicant made oath "that he verily believes that by reason of an insufficient or defective specification the aforesaid letters patent granted to T. S. Steadman is not fully valid and available to him."

The Court say there was no evidence before the Commissioner that the patent was "inoperative or invalid."

So, in the present case, there is not even an allegation of that.

Although the Act does not in terms require the application for the reissue to be in writing (Dental Co. *v.* Weatherbee, 3 Fisher,187), and does not require any affidavit that the applicant believes the original patent to be "invalid or inoperative," such application can only be upon the ground that the patent is invalid or inoperative. Whenever, therefore, it appears from the application that it is made on another ground, and that an insufficient one, the Commissioner exceeds his jurisdiction, if he grants such application.

In the present case it appears that the application for the reissue was made by the assignees on the ground merely that the patent was not in their judgment "fully valid *and available* to them."

Point 4.

REISSUE NOT FOR SAME INVENTION.—DISCLAIMER—ESTOPPEL.

The reissued Watt & Burgess patents of 1863 *are invalid, not being for the same invention as that patented in the original patent of* 1854, *and being in part for an invention disclaimed by the patentees in the original patent.*

Plaintiffs are estopped by that disclaimer.

See analysis of the original patent of 1854 and of the reissues of 1863, showing the discrepancy between the former and the latter (pages 26, 38, 47 of this brief).

Two patents were issued bearing the same date, one for a process, the other for a product or manufacture.

1*st. As to the reissued Patent for the Process.*

The first claim of this patent totally omits *the whole* of the process described in the first patent, and claims another invention, viz.:

"The process of treating wood or other vegetable substance " by *boiling in an alkali under pressure* as a process, or prepara- " tory process, for making pulp for the manufacture of paper " from such woods or other vegetable substance *substantially as* " *described.*"

The second claim in the process patent (which is omitted in the product patent) appears to have been inserted for the purpose of keeping up a show of some kind of resemblance to the original patent of 1854. But that second claim relates exclusively to the treatment of "*resinous woods,*" whilst the first claim includes any "vegetable substance."

2*d. As to the Patent for the Product.*

It describes the process by which the product is to be made. It is exactly the same process as that set forth in the process patent.

The claim is for "a pulp suitable for the manufacture of paper "made from wood or other vegetable substance, by *boiling* "the wood or other *vegetable substance in an alkali under* "*pressure substantially as described.*"

The argument of plaintiffs' counsel is that Watt & Burgess were the first to make pure paper pulp by chemical means alone, by which they mean pulp without any admixture of intercellular matter (their pulp, however, is of poor color and bad quality).

He contends that this pulp can be made into white (or whitish) paper (after the bleaching process, in which there is nothing new), "without any previous mechanical treatment," to reduce the fibres to the necessary length—that they are of the proper length as they come out of the pulping boiler (argument in Heft case, p. 128). And so he says here in a new product for which the inventors were entitled to a patent irrespective of any revealment of the process by which that product is produced.

"The product patent may be good and the process patented not good" (Argument Heft case, pages 62, 66, 67). "Where a man has been doing a thing by chemical agencies without understanding or properly describing the mode in which he does it, as soon as he discovers that mode, *it is his duty* to surrender his patent and take a reissue—*his duty*, not merely his privilege."

"It is of no consequence with regard to the *product* patent. With regard to the process patent, it is of importance to teach men how to do it."

This proposition is evidently untenable.

As to the supposed availability of the wood pulp without mechanical agency, it is admitted by plaintiff's witness, Dr. Rand, that "the use of the rag engine is necessary after the pulp is bleached before it can be made into paper" (fol. 386, q. 83).

There is a "prolonged beating" after the bleaching of the wood pulp (fol. 373, q. 5).

These reissues were obtained upon the written application of Wm. F. Ladd and Morris L. Keen, filed March 23d, 1863 (Record, fol. 740).

The application sets out the invention which the applicants say was made by Watt & Burgess.

Keen and Ladd make affidavit merely to the effect that "by reason of an insufficient or defective specification, the aforesaid patent is not fully valid and available" (Record, fols. 738, 739).

Judge Grier, in the Philadelphia case, held these reissued patents to be void.

Judge Cadwallader also held them to be void, but intimated his opinion to be that "the legal question under the reissue is not what they had intended to patent, but what they had in fact invented."

We submit that that is not the legal question upon a reissue, but that the real question is whether the reissued patent is for the "*same invention*" as that patented in the original patent.

These patents, not being for the "same invention" as that for which the original patent of 1854 was granted, are void.

Evidence of Experts.

Three experts who have been examined, Prof. Rogers (fol. 573), Mr. Henry B. Renwick (fols. 340, 341), and Mr. Edward S. Renwick (fol. 349 to 353), have proved that the invention described in the reissued patent is totally different from that described in the original patent. Plaintiffs' counsel have not attempted to invalidate their testimony by that of other witnesses (experts) but rely upon an *argument* that the invention is the same, and that the action of the Commissioner closes the question.

The opinions of those gentlemen, uncontradicted, are

decisive of the question as to the identity of the inventions. The reasons given by them for their opinions are perfectly clear and conclusive.

Theory of Plaintiffs' Counsel as to Reissues.

The theory of the plaintiffs' counsel is, that one who obtains a patent for a chemical process may, after trying it and discovering its defects, reissue the patent and make the necessary corrections, deductions and additions, so as to make the patent read for the improved process. Plaintiffs' counsel go further, and contend that it is the duty of the patentee to adopt that course so as to give the public the benefit of his more recent discoveries.

We maintain, on the contrary, that it is for the inventor to take *out a new patent for his new invention*, and that he has no right to reissue the old patent to *antedate* the new invention. For thereby he would shut out the intermediate inventions, and also avoid the necessity of taking an oath as to believing himself to be the inventor of the new method; he or his assignee has only to swear generally that there is some defect when a reissue is applied for.

The law does not allow the inventor to take the course which the plaintiffs' counsel say he ought to take, for the law only authorizes a reissue for the *same invention* with a more perfect description, or the abandonment of an over claim.

The Patentee's Oath as to invention claimed.

Watt & Burgess never claimed to have invented what their alleged assignees here claim as the invention of Watt & Burgess.

On the contrary, when *the patentees spoke for themselves, they declared that they did not claim* the operation of boiling in a solution of caustic alkali under pressure as a part of their invention (fol. 580). Now, their assignees say that it *was* a part of the invention of the patentees—the *principal part*, if not the *whole*, of the invention.

This point was met in the Court below by the plaintiffs' counsel, Mr. Jenckes, by the assertion that Mr. Burgess did swear to the reissue. He did not. True there is his affidavit appended to the bill in the present case (fol. 84), but that is another matter, and so is the affidavit used on the application for the extension of the patent.

The Act of 1836, sec. 6, requires the applicant for a patent to "make *oath or* affirmation that he does verily believe that he is the original and first inventor or discoverer of the art, machine, composition or improvement for which he solicits a patent, and that he does not know or believe that the same was ever before known or used."

The same act, sec. 13, authorizes a surrender by a patentee or his assignee of an "inoperative or invalid patent," and the issue of a new patent "for the *same invention*" for the residue of the term of the patent, "in accordance with the patentee's corrected description and specification."

That should not be held to authorize the issue of a new patent to either the patentee or his assignee, for anything *not covered by the original oath*. For on obtaining a reissue no oath respecting the invention is made by the patentee or his assignee, but the applicant merely makes what he calls a corrected description and specification.

Fraudulent practices in Reissues.

It was truly observed by plaintiffs' counsel in the Heft case (Printed Argument, p. 59), that: "There has been undoubtedly a great deal of smuggling in the pushing of patents through the Patent Office, by getting, in the first place, some patent that would pass the first examination, and then through the carelessness or heedlessness of examiners, or by worse means, getting a reissued patent to cover something more. That branch of business at one time arose almost to the dignity of a distinct profession."

His experience as Chairman of the House Committee on Patents doubtless enabled him to speak with knowledge on this subject.

There is a great necessity for a decision of this Court on the point now raised in this case—the decisions in the Circuit Courts being contradictory, and although this Court has more than once intimated an opinion on the question, it has never been distinctly decided.

Nobody has sworn, either upon the original application in 1854 or on the application for the reissues in 1863, that Watt & Burgess invented "the process of treating wood or other vegetable substance by boiling in an alkali under pressure" for making pulp.

The reissues merely recite the allegations of Watt & Burgess when they obtained the original patent. And that the assignees had surrendered that patent and obtained a reissue, which reissued patent they had surrendered, and obtained an order for the issue of new patents on two separate amended specifications.

The plaintiffs' proposition is, that Watt & Burgess, having invented a process for making "cellulose" from wood and other vegetable substances, had a right, in 1854, to take a patent for the product, and that having by mistake omitted to do so, they had a right to surrender that patent and take a patent for the product. And that as they had discovered one mode of making such cellulose, they had a right to a patent for the product by any and all processes.

That proposition was negatived by Judge Grier.

See on this point the case O'Reilly *vs.* Morse, 15 How., 62.

Reissue for invention disclaimed.

In Law's Digest, p. 616, mention is made of some unreported decisions of Judge Merrick, of the District of Columbia, and of Judge Ingersoll, to the effect that upon a reissue a party may claim that which in his original application he has disclaimed. We submit that those cases are not authority for the reissues in the present case.

The objection that the requisition of the Statute respecting the oath of invention would be avoided, if a patent could be reissued for a disclaimed invention, is decisive against the validity of such reissue.

The principle of *estoppel* also applies where there has been a disclaimer. See the case of Kendall *v.* Winsor, 21 *How.*, 322, as to what conduct or declarations of the patentee, prior to obtaining the patent, shall be held to be an estoppel, when other parties would be prejudiced by the retraction or repudiation of the patentee's former language or acts.

Of course a disclaimer may be made by mistake. But the question is not about the mistake, but the identity of the invention. How can it be said with the least show of reason, that the former patent is for an invention which the patentee says therein he does not claim. The former patent could not have been for such invention, and therefore the commissioner has no authority to grant a reissued patent for it. If he could, the provisions of the act respecting the oath of the inventor would be nullified.

It is easy for the patentee or his assignee (upon being advised that there is some defect in the original patent), to state generally that it is defective; he merely swears to a legal conclusion. And thereupon a new patent, with a different specification embracing another invention is obtained, *antedated* so as to cut out prior inventions, and all this without the oath required by the Act of Congress upon an original application.

Even if the patentee himself could revoke his disclaimer, his assignee could not do so. He is estopped by the disclaimer of the patentee.

It would be unreasonable to permit the assignee to claim as the invention of his assignor, that which the latter declared he had not invented.

Mr. Jenckes argues (see his criticism on the decisions of Judges Grier and Cadwallader, p. 7), that "If they (Watt and Burgess) antedated their invention in this case, it is for the public advantage, not their own, for they thereby shorten the time for which their monopoly might have been secured."

Cannot Mr. Jenckes see that by antedating an invention, the patentee has the benefit of the legal presumption that the

invention was made at the time stated? That presumption would render worthless proof of the fact, that the thing claimed as new was in common use after the false date of the invention, but before the reissue of the patent.

Jurisdiction of the Commissioner of Patents on Reissue.

See *Curtis on Patents* (Edition of 1867), sects. 279 to 282, and notes.

The proposition which we contend against is, that the reissue concludes the question of identity (in the absence of affirmative proof of fraud), although it appears on the face of the papers that there is no identity.

The Commissioner has no legal power or authority to reissue a patent for an invention different from that of the original patent. This is a *jurisdictional* question. The validity of the patent depends upon it. The decision of the Commissioner, as to the identity of the invention, is no more conclusive than his decision that the patentee is the inventor, or that the assignee has proved his title.

Although the Commissioner, in granting a reissue, has to see that the party surrendering the original patent is the true owner, yet the Commissioner's decision on that point does not conclude the question in a suit on the reissued patent.

It is further to be observed that, when it is evident on the face of the patent that the reissue is not for the same invention as that described in the original patent, the inference is irresistible that the object of the patentee in obtaining a reissue, instead of a new patent, is to antedate the alleged invention. And that presents what the Supreme Court, in *Moody* v. *Fiske*, 15 *How.*, 215, speak of as "a fraud committed on the public."

Cases on Reissues for different Inventions.

Judge Story appears to have considered that the question was not examinable, "unless it appear *on the face of the patent* "that he (the Commissioner of Patents) has exceeded his authority," by granting a reissue for an invention not the same

as that described in the original patent. Woodworth *v.* Stone, 3 Story, 748.

But Judge Woodbury held, that *evidence* was admissible to show that the original patent did not cover the invention claimed in the reissue. Allen *v.* Blunt, 2 Wood & M., 121.

In *Stimpson* v. *The Westchester Railroad Co.*, 4 *How.*, 380, the Court held, page 403, "Whether the new patent was substantially for a different invention from the first one, was a *question for the jury* on the evidence. "And we suppose that the inquiry in regard to the *surrender* is limited to the fairness of the transaction. In whatever manner the mistake or inadvertence may have occurred, is immaterial. The action of the Government, in renewing the patent, must be considered as closing this point, and as leaving open for inquiry before the Court and jury the question of fraud only" (p. 404).

The objection that the reissued patent embraced a matter not in the original patent, was not well taken in that case, as it was not *claimed* in the new patent, but only referred to in the specification (p. 396).

O'Reilly v. *Morse*, 15 *How.*, 111, 112:

"There is nothing in the *proof* or on the *face* of the *reissued patent*, to show that the invention therein described is not the same with the one intended to be secured by the original patent. It was reissued by the proper lawful authority, and it was the duty of the Commissioner of Patents to see that it did not cover more than the original invention. It must be presumed therefore, that it does not, *until the contrary appears.* Variations from the description given in the former specification, do not necessarily imply that it is for a different discovery."

In Brooks *v.* Fiske. 15 How. Rep., 215, the Court speak of a reissue as "a fraud committed on the public," where the patentee by giving his reissued patent of 1845 date as an original discovery made in 1828, thereby overreached similar inventions made between 1828 and 1845.

In *Burr* v. *Duryee*, 1 *Wallace*, 531, the counsel sustaining the reissue, argued thus (*p.* 557): "If the last reissued patent claimed under be adapted to the invention made by the patentee, *and described in his original patent*, it is valid as a reissue."

They did not contend that the granting of the reissued patent closed the question whether the invention described in the reissued patent was the same as that described in the original patent. But, they argued that the action of the Commissioner of Patents, in accepting a surrender of a patent and granting a reissue, is conclusive that *the prerequisites to the surrender* did exist, unless fraud be shown.

In that case the Court say:

"The surrender of valid patents and the granting of reissued patents thereon, with expanded or equivocal claims, where the original was clearly neither 'inoperative nor invalid,' and whose specification was neither 'defective nor insufficient,'" is a great abuse of the privilege granted by the statute, and productive of great injury to the public. This privilege was not given to the patentee or his assignee in order that the patent may be rendered more elastic or expansive, and therefore more "available" for the suppression of all other inventions."

In the following cases it was held, either that the decision of the Commissioner on granting a reissue, should be deemed conclusive on the question as to the identity of the invention or that the reissue might be for an invention actually made by the patentee, although not covered by the original patent.

House vs. *Young*, 3 *Fisher*, 335, *Sherman, J.*
Hussey vs. *Bradley*, 2 *Fisher, Nelson and Hall, JJ.*, (1869).
Whiteley vs. *Swayne*, 4 *Fisher*, 123, *Leavitt, J.*
Am. Wood-Paper Co., vs. *Heft*, 3 *Fisher*, 316, *per Cadwallader, J.*
And see French vs. *Rogers*, 1 *Fisher*, 133, *Kane, J.*
See also Woodward vs. *Dinsmore*, 4 *Fisher*, 232, *Strong, J.*

In the following cases it was considered that the reissue is

void, when, upon a comparison between it and the original patent it is seen that they are for different inventions.

Carhart vs. *Austin*, 2 *Fisher*, 543, *Clifford, J.*

Poppenheusen vs. *Falke*, 2 *Fisher*, 181, *Shipman, J.*

Potter vs. *Holland*, 1 *Fisher*, 382.

Middleton Tool Co. vs. *Judd*, 3 *Fisher*, 141, *Shipman, J.*

Chicago, &c., Co. vs. *Busch*, 4 *Fisher*, 395, *Blodgett, J.*

Parham vs. *Am. Button-hole Co.*, 4 *Fisher*, 408, *Strong and McKennan, JJ.*

In the following cases it was held that the reissue must be confined to the invention covered by the original patent.

Knight vs. *Balt. & O. R. R.*, 3 *Fisher*, 1, *Taney, C. J.*

Goodyear vs. *Berry*, 3 *Fisher*, 439, *Leavitt, J.*

In the last cited case the Court say that according to the late cases, the decision of the Commissioners is open to examination.

Hoffman vs. *Brandt*, 3 *Fisher*, 218.

Dyson vs. *Danforth*, 4 *Fisher*, 133, *Grier and Field, JJ.*

Brown vs. *Selby*, 4 *Fisher*, 363, *Drummond, J.*

Seymour vs. *Osborne*, 3 *Fisher*, 555, *Nelson and Hall, JJ.*

In the last cited case the Court state that the more recent decisions hold that the propriety and legality of the reissue are examinable.

In *Eureka Co.* vs. *Bailey Co.*, 11 *Wall*, 488, it was held that "It may be shown in a suit on a reissued patent that it covers matter not part of the original invention."

The invention patented in the reissue must be shown or suggested in the original specification.

Sawen vs. *Hall*, 9 Blatch., 524.

The patent *act of* 1870, *sec.* 53, provides that when there is neither model nor drawing, the specification in a reissued patent may be amended so that new matter may be introduced on proof satisfactory to the Commissioner that it was part of the original invention, and was omitted by inadvertence, &c.

The act relates only to the patents granted after its passage.

Judge Benedict holds in this case " that the reissued patent " is for a process substantially different from any described in " the original patent."

Point 5.

REISSUE—SEVERAL PATENTS.

The issue of two Patents in lieu of one was not authorized, as they are not for distinct and separate parts of the thing patented.

By § 13 of the Act of 1836, reissues are permitted only in two cases; when the patent is invalid or inoperative by reason of a defective or insufficient description or specification; or by reason of the patentee claiming more than he had a right to claim as new.

Section 5 of the Act of 1837, does not specify or declare any new *cause* for reissue, but only provides that if "the patentee shall desire several patents to be issued for *distinct and separate parts of the thing patented*," he can have that privilege.

But the invention must consist of *distinct and separate parts* —such that separate patents could originally have issued to the inventor, or such that separate patents could have been granted to different individuals for such parts.

When a new process is invented, and which results in the production of a new product, there can be no *separate parts*. The process cannot be used without producing the product, and the product cannot be obtained except by the use of the process.

The process and product together constitute but *one invention*, of which there are no *distinct and separate parts*.

See Vance vs. *Campbell*, 1 *Black*, 427.

The reissues being void the surrender is void also, and the rights of the parties remain as they stood before.

Woodworth vs. *Hall*, 1 *Woodb. & M.*, 248, 389.

Point 6.

THE REISSUED PATENTS—CONFLICT BETWEEN THEM.

The reissued patents are invalid because they are both for the same invention.

There is nothing to give priority to one of the patents over the other.

The descriptive portions of the specification are alike, *verbatim et literatim*. In the claims alone they differ. One claims the product "as a new article of manufacture," the other claims the process by which the manufacture is produced.

The claim, as a "new article of manufacture" is, "a pulp suitable for the manufacture of paper, made from wood or other vegetable substances, *by boiling the wood or other vegetable substance in an alkali under pressure, substantially as described.*"

This includes the *use of the process*, as well as the *making of the product*, and covers both, one as much as the other. You cannot make the product without using the process, because pulp made in any other way, even though it might be in all other respects identical with that made by this process, would not be within the claim.

So, on the other hand, the process described in the other patent cannot be used, without producing the manufacture described in that product patent.

Both specifications being identical in what they direct to be done, of course action under both must produce exactly like results. *A licensee under the product patent, would have a right to use the process, and a licensee under the process patent would have a right to make the product.* A license, therefore, under either patent, would give the same right to the licensee, *and a license under one patent would give all the rights which a license under both would give.*

This demonstrates the complete identity of the two patents.

We insist that both patents are void on this account.

Point 7.

REISSUE.—CONCEALMENT.—INSUFFICIENCY OF SPECIFICATION.

The reissued patents of 1863 are invalid, on account of the concealment of the alleged discovery or invention of the patentees.

And for insufficiency of the specification.

Concealment.

Plaintiffs' witness Burgess, says (fol. 224, q. 106): "I found that a definite temperature was necessary to obtain this desired end," *i. e.* 366° to 372°, for the reduction of *woods* to pulp.

The witness gives no satisfactory reason for not disclosing his alleged discovery as to the temperature required to pulp *wood*, resinous or non-resinous (fol. 224, q. 106). He left the public to find out what he alleges he discovered.

The practice of the plaintiffs is to use the above mentioned high-pressure and temperature which Burgess says he found to be necessary (fol. 216, q. 63; fol. 430, q. 45).

The alleged invention consisted in the alleged discovery that the pressure theretofore used was insufficient to accomplish the object required. The patent does not state what will accomplish it. And plaintiffs' witness Keen says that they keep it a profound secret (fol. 456).

A patent for a chemical discovery would be a mockery, if the Courts were to sanction the course adopted by the patentees in the present case.

In this case we have only a statement as to the pressure that "a heat and corresponding pressure from 300° to 500° may be used, according to the nature of the vegetable substance to be treated."

The patentees knew that wood could not be disintegrated by the use of an alkaline solution of the strength of 10° of the English hydrometer (see their specification, fol. 27), the temperature of the boiling liquor being only 300°.

The minimum strength of alkali required is about 14° for non-resinous, and 17° to 18° for resinous woods (fol. 976, q. 39).

The statement therefore that 300° F. (less than 45 lbs.) will do, is false, and the statement respecting the use of 500° is illusory and deceptive, and avoids the patent. It is shown that if 500° F. were applied, the result would be charcoal (Rogers, fol. 572; *E. S. Renwick*, fol. 355, q. 17).

The Act of 1836, section 15, provides that the defendant in any action upon a patent may set up for defence (under notice), evidence "tending to *prove* that the description and specification filed by the plaintiff does not contain the *whole truth* in relation to his invention or discovery," the concealment being "for the purpose of deceiving the public."

The amended answer in this case sets up this defence (fol. 121).

Where the concealment is apparent from a comparison of the original patent with the reissued patent, or where it appears from the plaintiffs' own testimony, the patent is invalidated, even although the defendant has not given any notice of his intention to raise the objection that there has been a fraudulent concealment.

Insufficiency of Specification.

Even if there be no wilful concealment for fraudulent purposes, a patent is void if the specification do not state in what the improvement consists, in full, clear and exact terms. (Act of 1836, sec. 6.)

Evans v. *Hattick*, 3 *Wash. C. C. R.*, 408.

Wood v. *Underhill*, 4 *How.*, 1, is an authority for the proposition that these reissued patents are void because they do not state the steam pressure required (according to the patentee's theory as now presented), to pulp the woods commonly treated. "No one could use the invention without first ascertaining by experiment" the pressure required. Consequently the patent is void.

See *Case* v. *Brown*, 2 *Wallace*, 320, as to a claim of any mode that would produce the desired effect.

In *Kendall* v. *Windsor*, 21 *How.*, 322, the Court say, that the ultimate object of the patent laws is to benefit the public by the use of the invention after the temporary monopoly shall have expired. It follows that it was necessary to the validity of the patents now in question, that they should give more information than they do.

Point 8.

WANT OF NOVELTY.—PATENT TOO BROAD.

The reissued patents are too broad, there being at all events no novelty in boiling some vegetable substances in a solution of caustic alkali under pressure at or *near* 300° F., for the manufacture of paper pulp therefrom.

The question to be considered is, whether it was a new thing to boil any vegetable substance in a solution of caustic alkali under pressure at or *near*, or above 300° F., "as *a process or preparatory process for making pulp.*" The specification defines what is meant by the words "alkali" and "under pressure," as used in the claim and specification (fol. 27).

If we show that any vegetable substance has been boiled in any solution of "caustic alkali," of any strength or quality, at or *near* a temperature of 300° F., it will avail the plaintiffs nothing to show, as Dr. Rand, plaintiff's witness, endeavors to, that in the processes described in the various patents referred to, the alkali used was weak, or that the boiling under pressure was not the only process, but constituted only a part of the process, or a mere *preparatory* process, to be followed by the use of chlorine as a disintegrating agent, or by other chemical processes, or by mechanical operations (see as to his theory, page of this brief).

The object of the patentees was to embrace all boiling of vegetable substances in a caustic alkali under the pressure mentioned, and they must stand or fall by that claim.

If Watt and Burgess wanted to claim the discovery or invention of a *single stage* chemical process for the reduction of wood to pulp by the use of high pressure and strong alkali, they should have taken out a different patent.

Strength of Alkali called for.

The patent is not confined to a process in which very strong

alkali is used; and if it were so limited, the alkali directed to be used in the patent of Gros was 9° Beaumé, whereas the Watt and Burgess patent directs the use of about 10° of the English hydrometer (Twaddell) for some woods (that is about $6\frac{1}{2}$° B.; see table, fol. 390), and as to other vegetable substances, no specific directions are given.

As to the strength of the alkaline solution to be used, the specification in the Watt and Burgess reissued patents states that for non-resinous woods 17° of the English hydrometer answers very well, and that for resinous woods "a strength of about 12° "is sufficient, but varying with the nature of the vegetable "substance, being acted upon to a strength of about 10°" (fol. 27).

These figures relate to *woods* only, but the patent embraces all *vegetable substances*, and the specification goes on to state that, "the varied nature of the vegetable substance to be "acted upon is such, that only general directions can be given "for the strength of the alkali or the degree of heat to be used, "or the duration of the operation" (fol. 27).

The pressure is to be from 300° to 500°, "according to the "nature of the vegetable substance to be treated;" that is to say, they mean the patent to cover the pulping of all vegetable substances by a boiling in a solution of caustic alkali, under pressure "at, *near*, or above 300°."

Burgess says, he intended the patent of 1854 to apply to all vegetable substances boiled in alkaline solutions, whether under pressure or in an open vessel which could produce paper pulp (fol. 234, q. 146), and that the patent is not for any particular quality of paper (fol. 235, q. 149).

And he says that what he considers as claimed in the first clause of the reissued patent of 1863, No. 1,449 (the process patent), was "the use of boiling of vegetable substances in "alkali under pressure" (fol. 237, q. 156).

Gros' Patent, Pressure and Alkali called for.

The Watt and Burgess patent then claims as new what is shown by the *Gros* patent to be old, and what is shown to be

old by the testimony of defendants' witness, *Howland* (fol. 256, q. 8 to 16; fol. 317, q. 10, 11; fol. 324, q. 69). As to this (see points 23 and 24.)

The defendants have proved that the patent of Gros (fol. 838, see analysis of the patent, page 22 of this brief) describes a process of treating the broom plant "by boiling in "an alkali, under pressure, as a process or preparatory process "for making pulp for the manufacture of paper" therefrom.

The boiling prescribed is at a pressure of about 3 *or* 4 atmospheres (fol. 835), not from "3 *to* 4 atmospheres about," as erroneously *translated* (fol. 845).

The "alkali" to be used is a solution of the strength of about 9° B., that being the strength of a solution containing 10 per cent. of its volume of soda-ash, rendered caustic by 5 per cent. of the solution of lime (fol. 380, q. 45, fol. 574, q. 10).

Plaintiff's witness, Rand, admits that the temperature 3 or 4 atmospheres, with a caustic alkali solution of 5° B., would be within a degree of 300°. That would be "*near*" 300°, within the meaning of the word "*near*" in the patent, and if we take $4\frac{1}{2}$ atmospheres, which would be "about" 4, we have a temperature *above* 300°.

(See as to the process of Gros, p. 130 of this brief, on the Mellier patent.)

See the testimony of H. B. Renwick (fol. 342, Q. 4), showing that the temperature described in Gros' patent comes within the limit of temperature prescribed by Watt and Burgess patent.

Use of 60 *lbs. pressure in the U. S.*

And defendants have proved, by the evidence of Howland, above referred to, that in the United States vegetable substances, *i. e.*, shives of hemp and cotton seeds have been boiled in a caustic alkali, under a pressure of 60 lbs., to make paper-pulp for white paper, not casually or incidentally, but with full knowledge of the utility of that pressure for the purpose.

(See as to this fact pages 121 to 124 and p. 129 of this brief on the Mellier patent).

Cases as to Patents being too broad.

If a *patentee include in his patent anything already known, the patent will be broader than the invention, and consequently void* (*Davis* vs. *Palmer*, 2 Brock., 310).

A patent must not be broader than the invention, or it will be void, not only for so much as had been known or used before the application, but also for the improvement really invented (*Whitney* vs. *Emmett*, Bald., 314. *Wyeth* vs. *Stone*, 1 Story, 286).

If a patentee claims something which is not his invention, his patent claims too much, and its validity may be assailed on that ground, even though the part illegally claimed may be of slight value or importance (*Parker* vs. *Sears*, MS.—Grier, J., Pa., 1850; Law's Digest, page 529).

The only Remedy is a Reissue.

The Act of 1837, sec. 9, is unavailing to the plaintiffs in this case, for the claim cannot be so modified as to remove this objection.

Vance vs. *Campbell*, 1 Black, 427, decides that that section "applies only to cases where the part invented can be clearly "distinguished from that claimed but not invented" (see an illustration of this in *Morse* vs. *O'Reilly*, 15 How., 111, where the 8th claim of the patent was struck out, the suit maintained but no costs decreed to the plaintiff).

See also The Rumford Chemical Works *v.* Lauer, per Blatchford, J.—Patent Office Gazette, April 1, 1873.

A reissue is the proper remedy for a variety of cases not embraced by the provision in sec. 9 of the Act of 1837.

Point 9.

INVENTION DISPROVED.

It is evident that the patentees had not made the alleged discovery or invention when they obtained the English patent of 19th August, 1853.

In that provisional specification, no allusion even is made to high-pressure boiling, which is of the essence of the alleged invention claimed by the reissues.

It is also manifest from the contents of the American patent, obtained in 1854, that the patentees had not then made the alleged discovery as to the necessity of very high pressure boiling to pulp wood by a single stage process.

See Point 2 and Point 7.

Point 10.

SINGLE STAGE PROCESS.

If the novelty consists in the use of a single stage chemical process, then the plaintiffs' case fails, as the defendants do not use that process but a totally different one, viz., a compound process whereby the woody matter is reduced to pulp before the final alkali treatment.

Plaintiffs' witness, Rand, says, that by the Watt and Burgess patents there is "the single action of caustic alkali at the high temperature named" (fol. 383, q. 62).

This testimony accords with that of Mr. H. B. Renwick (fol. 341, q. 2), Mr. Ed. S. Renwick (fol. 351) and Prof. Rogers (fol. 573).

It also accords with the position taken by Mr. Burgess, in his correspondence with the Patent Office, on his application for the reissues of 1863 (fol. 758). "We claim the production of a perfect pulp by the *sole action* of alkaline solutions, under a given pressure." "We believe we are the first who used an alkaline solution under the necessary pressure to ensure the desired temperature, as a *sole means* of producing a perfect pulp."

That single stage process differs entirely from the process used by the defendants, as to which see points 24 to 27.

It is admitted by plaintiffs' witness, Burgess, that the pulp made by the defendants, to be afterwards boiled with caustic alkali under pressure, was not a vegetable substance within the meaning of the Watt and Burgess patent (fol. 224, q. 109).

See further as to the patent being for a single stage process, the argument on the Mellier Patent, Points 24, 25, 26, 27.

THE BOILER PATENTS.

Point II.

The Patent granted to Keen, Sept. 13, 1859 (fol. 74).

Keen's Boiler Patent of 1859 is for a combination of stirrers of a particular form, with an ordinary expansion chamber and discharge-valve.

Defendants used a different stirrer and discharge-valve.

Stirrers are abandoned as useless.

The patent is void, one of the elements of the combination being useless.

This patent is for a boiler "with an expansion-chamber, "*stirrers* and *discharge-valve*, or cock *arranged for the purposes* "and in the *manner* substantially as herein stated" (fol. 76).

As to the Stirrers.

1. The stirrers are useless (fol. 374, q. 10; fol. 220, q. 92; fol. 286, q. 177; fol. 141, q. 20).

2. They were only used experimentally (fol. 141, q. 18).

3. They were abandoned before this suit was brought (fol. 265, q. 17).

4. Plaintiffs do not use them at all (fol. 220, q. 91).

5. The patent is for a boiler with "the patent stirrers" of the peculiar construction described in combination with other things specified (fol. 219, qs. 81 to 84 [Burgess]).

(As to points of similarity between Wright's and Keen's boilers (fol. 384, q. 68 [Rand]).

6. The stirrers being useless, the patent is not for "a new and useful invention," within the meaning of the Patent Act.

Curtis on Patents, sec. 383: "If anything claimed as an

essential part of the invention is useless altogether, the patent is invalid, because there is a total failure in point of usefulness" (*Lewis* vs. *Marling*, *Webster's Patent Cases*, 490, 495).

In the Heft case, plaintiff's counsel, Mr. Jenckes, arguing in support of the reissues of the Watt & Burgess patents, says (p. 82): "Take, as an illustration, one of the other patents in this case. *The first patent of Keen is for a combination in which every element is supposed to be necessary. The stirrers are found to be useless. It is our duty to reissue that patent if we stand upon it.*"

As to the expansion chamber and discharge valve, see next Point.

Point 12.

KEEN'S BOILER PATENT OF 1863.

1. For a perforated diaphragm having a perforated well or cylinder.

2. For an ordinary discharge-valve in combination with the peculiar diaphragm.

Defendants did not use such a diaphragm, and there is no novelty in the discharge-valve.

The claims in this patent are as follows:

"1st. A boiler provided with a perforated diaphragm and "well, or their substantial equivalents arranged in the manner "and for the purpose described.

"I also claim, in combination with *the* boiler, the arrange- "ment of the discharge-pipe and valve, for the purpose of "blowing-out or discharging the contents of the boiler under "pressure, substantially as and for the purpose set forth."

The patent declares the invention to be as follows: "My "invention consists in connecting the man or feed hole in the "shell of the boiler with the man or *feed hole through the dia-* "*phragm* by a perforated well or cylinder, so that the material "can be charged through said well into the boiler without fall- "ing upon or clogging the perforated diaphragm."

Defendants do not use the contrivance, but charge the boilers through a man-hole below the diaphragm.

It is not pretended that the perforated diaphragm, without the well, was a new invention. On the contrary, the specification referring to that contrivance as being in common use, says: "In boilers where a perforated diaphragm is placed in the interior" (fol. 79).

As to what plaintiffs' witness, Burgess (who is not a mechanical expert) says, it is general and vague, and he mistakes the facts as to the construction of defendants' boilers—erroneously supposing that they are charged at the top (Burgess' 1st examination, fol. 154, question 7), whereas they are charged *below* the diaphragm (fol. 265, q. 18).

Burgess, however, admits that the diaphragm must be substantially as described in the specification, and that he does not know whether there is such a diaphragm in defendants' boilers (Burgess, fol. 239, qs. 162, 163).

The boilers used by defendants had :

1. A perforated diaphragm near the top of the boiler, to prevent the material under treatment from rising up into the expansion-chamber (fol. 72, q. 10 ; fol. 265, q. 18).

2. A stirrer, to stir the material (fol. 72, q. 10).

3. A discharge-valve at the bottom, for the discharge of the material from the boiler (fol. 279, q. 127).

Perforated diaphragms in pulping boilers are old. Keen's patent refers to them as old (fol. 79). Keen's patent is for a peculiar form of diaphragm, with a well (fol. 79), which is not used by the defendants (fol. 329, q. 4 ; (H. B. Renwick), fol. 344, q. 4 ; (E. S. Renwick).

Whenever there is a diaphragm, there is, of course, an expansion-chamber (fol. 232, Renwick, q. 8). Wright's boiler had an expansion-chamber (fol. 294, q. 11, Wright).

The *stirring apparatus* in Keen's boiler is so constructed and placed that the boiler "may be charged through the manhole without the stock falling upon the vanes or stirring-arms" (fol. 75 ; see fol. 329, q. 3, Renwick).

The single stirrer used in defendants' boiler, was a propeller on an upright hollow shaft ; it was in the way when the boiler was charged (fol. 330). Keen's new plan of working stirrers was merely to avoid that inconvenience (fol. 75).

Stirrers in pulping boilers are not new.

Wise's patent has a stirrer (fol. 331, q. 7, H. B. Renwick). Wright's also (fol. 765).

As to the Discharge of the Boiler.

The discharge of the contents of a pulping-boiler, by blowing out the same through a discharge-cock or valve at the bottom, is not new.

Wright adopted that method (fol. 294, q. 11, Wright ; fol. 332, q. 8, Renwick).

And, the Watt & Burgess reissued patent of 1863 directs that mode of discharging the boiler (fol. 27).

It does not claim it as the invention of the patentees, but describes it as being employed in the process invented in 1853.

Rand says he was informed by McCracken, that the pulp was blown out of defendants' boiler into a tank, &c.

Mr. Rand draws this inference: "The pulp could only be "blown out of a boiler by having an opening at or near the "bottom of the boiler furnished with a *valve* or its *equivalent*, "substantially the same as in Keen's Patent" (fol. 171, q. 11, Rand).

That is to say, any mode of blowing-out must be, according to Mr. Rand, "substantially the same as in Keen's Patent."

Mr. Rand was evidently under the impression that the blowing-out is a new invention of Keen's, wherefore any valve, or any equivalent of a valve would be substantially the same thing as Keen patented. And of course it could not in that aspect of the case signify how the valve should be worked.

But the witness is entirely mistaken on this point, as to the invention, as we have already shown.

According to his theory, any mode of blowing-out would be substantially the same as in Keen's patent, and any perforated diaphragm which should keep the contents of the boiler submerged, would be the perforated diaphragm described in the patent, which, however, merely claims the combination of a very special perforated diaphragm (with a *well*, designed to serve a certain useful purpose, fol. 79), with the special arrangement of the discharge-pipe and valve described in the patent.

Plaintiff's witness, Dr. Rand, in his original examination, speaking of the discharge valve in Keen's boiler, says:

"The object in Keen's boiler is, by the rapid expansion of "the steam, to separate the fibres of the material which has "been already chemically disintegrated, thus much facilitating "subsequent washing by percolation" (fol. 367, q. 58).

Keen's boiler patent of 1863 *says nothing* at all about disintegration by the rapid expansion of the steam, but only speaks of the mere emptying of the contents of the boiler by the

steam pressure in the boiler, just as Wright's patent does, and as the Watt and Burgess reissued patents do. And see Burgess' testimony (fol. 156, q. 11), describing how the defendants emptied the boiler.

The mere discharge of the boiler may be effected by a low head of steam.

If the disintegration of the material is to be effected by the explosive force of the steam according to the Lyman process (see ante, page), then the pressure at which the material is boiled, say 160 lbs., will be used, and a very strong chamber will be required to receive the exploded material.

As the Watt and Burgess reissued patents speak of the discharge of the boiler by blowing out the contents, there is no pretence for saying that the *mere discharge*, with the incidental consequences, whatever they may be, was the invention of Keen.

And no claim is set up by Watt and Burgess to that method of discharging the boiler as *their* invention.

The fact is that until some time after the date of Lyman's patent no one thought of using such high-pressure steam as that which the complainants began to use in 1859, viz., 160 lbs. and upwards (fol. 430, q. 145).

The first invoice of paper made by the parties under whom the complainants claim, from material "blown out under pressure of steam when cooked" was September 12, 1859 (fol. 432).

Each of the two boiler patents is for a combination of old contrivances.

And there is no pretence for saying that the defendants' use all the elements of either of those combinations.

There is no infringement of a patent for a mere combination, unless all the elements of the combination are used.

Prouty *vs.* Ruggles, 16 Peters, 336.
Carver *vs.* Hyde, 16 Peters, 513.
Stimpson *vs.* Balt. R. R., 10 How., 345.
Byan *vs.* Eddy, 2 Blatch., 521.
Rich *vs.* Close, 8 Blatch., 41.

Eames vs. *Godfrey*, 1 *Wallace*, 78. "Where a patent is for a combination of distinct and designated parts, it is not infringed by a combination which varies from that patented, in the omission of one of the operative parts and the substitution thereof of another part substantially different in its construction and operation, but *serving the same purpose.*"

The only mechanical experts who have been examined consider that defendants' boiler does not infringe either of Keen's boiler patents (see testimony of Henry B. Renwick and Edward S. Renwick, Record, fols. 328 to 331, and fols. 344 to 346).

Judge Benedict holds that each of the boiler patents is for a combination which is not used by the defendants.

In the Philadelphia case, a similar decision was made by Judges Grier and Cadwallader, with regard to the boilers used by the defendants in that case.

Point 13.

NON-PATENTABILITY OF HIGH-PRESSURE BOILING.

Mellier was not the first to discover the utility of the use of a steam pressure as high as seventy pounds, in boiling in a solution of caustic alkali fibrous materials for the manufacture of paper-pulp.

And even if he had been, he could not take a patent for that use alone, as prior patents call for the use of such high-pressure boiling without limit.

And the complainants are estopped by the allegation in their bill, that Watt and Burgess preceded Mellier.

Mellier not the first to use Steam Pressure Boiling.

The utility of high steam-pressure, when boiling materials in a caustic alkaline solution to be *bleached*, is explained in the patent of Turnbull, dated Nov. 15, 1800. (See Abstract of this Patent, page 12 of this Brief.)

The superior efficacy of such boiling is there pointed out, and the saving of the alkali.

And we find the advantages of a boiling of fibrous materials in caustic alkali, under pressure, recognized as a well-known fact by parties taking out patents for making paper pulp—none of them pretending that they had discovered the advantages of high-pressure boiling—but merely calling for it in combination with various devices and processes.

The Examiner was right when he rejected Mellier's application, saying (fol. 455):

"No specific strength of alkaline solution, such as you have "named, can be allowed you, nor any degree of heat or pres-"sure of boiler."

He refers to the fact that more than twenty applications had recently been made, for treating fibre with alkali, of various strengths and in various ways (fol. 455).

We have seen that Montgolfier and Wright called for high-pressure without any limit.

Plaintiffs' witness, Dr. Rand, testifies as follows : (fol. 380).

Q. 41. Does not the French patent of Montgolfier Fréres of 1838 describe a process of treating wood by boiling in a caustic alkali, under pressure, as a preparatory process for making pulp for the manufacture of paper from such wood?

A. It does.

Q. 42. Do Montgolfier Fréres fix *limits to the pressures* under which they boil vegetable matters in caustic alkali?

A. They do not.

Q. 43. After the boiling in caustic alkali under pressure, do not Montgolfier Fréres provide for bleaching the pulp?

A. Yes (fol. 382).

Q. 55. Does not Lemuel Wright, in his English patent of 1843, describe a process of boiling vegetable substances in caustic alkali, under pressure, as a preparatory process for the making of pulp for the manufacture of paper from such vegetable substances ?

A. He does.

Q. 56. Does Wright, in specific terms, *limit his pressure?*

A. He does not.

Q. 57. After the pulp has been produced by the boiling in caustic alkali, does not Wright call for the bleaching of it by hypochlorite of lime, or chloride of lime, as it is commonly called, to make white paper *?*

A. He does (fol. 382).

Q. 58. What would be the temperature under which the straw is boiled in strong lye, under pressure, according to the description contained in the *Central Blatte* of September 27th, 1852, and in the *Industrie Austellung* of 1851 ?

A. It would be somewhat above 341° Fahrenheit (fol. 382).

That would be about 100 lbs. pressure.

Anyone using the processes of Montgolfier and Wright has the right to use any pressure found to be necessary.

The proposition upon which plaintiffs seek to sustain the reissue of the Watt and Burgess patents in 1863 is, that as they referred, in their original patent of 1854, to boiling under pres-

sure, that warranted the use of any pressure found to be necessary (fol. 161, Burgess, q. 25).

Plaintiffs' counsel argued in the Philadelphia case (printed argument, p. 123), that Burgess having claimed pressure generally "he was not limited to any particular degree."

We do not deny that proposition.

But why should Burgess, on the strength of his mere *allusion* to the use of steam-pressure, have the right to boil under any pressure, if Montgolfier and Wright, whose patents call for high-pressure steam without limit, could not do so?

Wright was accustomed to the use of high-pressure steam, having applied it successfully in bleaching. He constructed high-pressure boilers for bleaching, and sold them in France, England, Ireland and Russia. He boiled straw (experimentally) in his boiler at Stockport at 80 lbs. pressure (fols. 401, q. 39; fol. 411, q. 86), but his practice was at Chalford to use only 50 lbs., because there was no advantage in applying a higher pressure to straw which had been previously reduced to pulp by chemical and mechanical processes (fol. 404, q. 51).

It will be observed that Wright was *plaintiffs' witness* in testifying as to what he did in England.

Mellier was not the first to use 70 *lbs. pressure.*

The claim now set up for Mellier, that he was the first discoverer of the utility of using as *high* as 70 lbs. or thereabouts in boiling fibrous materials in a caustic alkaline solution to make paper pulp, is refuted by the article upon the manufacture of paper from straw in England, published in the *Central Blatte*, for the manufacture of paper in Germany, in September, 1852.

It is also refuted by Wright's testimony, *taken on behalf of the plaintiffs* (fol. 401, q. 39).

And it is totally inconsistent with the allegations in the bill of complaint, showing that Watt and Burgess preceded Mellier.

That allegation estops the plaintiffs from alleging that Mellier discovered or invented high-pressure boiling with a solu-

tion of caustic alkail, to disintegrate vegetable fibrous materials for the manufacture of paper pulp.

And Watt and Burgess were (as we have shown) preceded by others.

In this case it cannot be denied that Watt and Burgess precede Mellier. Mellier's patent is antedated to 7th August, 1854, but Watt and Burgess' patent is dated 18th February, 1854, antedated to 19th August, 1853.

If, therefore, Mellier's patent is treated as a patent for boiling straw in a solution of caustic soda under pressure without limit, then it is antagonistic to the reissued patent of Watt and Burgess, which clearly embraces the reduction of straw to pulp by boiling the straw in a solution of caustic soda under pressure at near or above 300 Fah.

Complainants are, therefore, *estopped* from contending that Mellier's patent is valid if it be construed to be a patent for boiling straw in a solution of caustic soda without limit, for it is not competent for them to claim in the same bill of complaint that the Mellier patent is valid, showing and claiming at the same time a patent for the same invention of prior date.

If, however, the Mellier patent be treated as a patent for an improvement, consisting in the combination of a certain degree of heat with a certain quantity of alkali alleged to be sufficient for the treatment of a specified material, so that it can be bleached in the way described in the patent, then there is no conflict between the patents—the one is a mere addition to or improvement upon the other—and we then have to deal with another set of questions.

The German publication.

The article in the *Central Blatte* is published "from the notes to the official report of the London Industrial Exhibition," by Oeschilhauser, a gentleman represented to be "well skilled in the art of manufacturing paper."

The statement in that article, that in England the manufacturers of paper from straw boil it "*in a strong lye under a pressure of* 6 *to* 8 *atmospheres*," contains a distinct announcement of the fact that a steam pressure above 70 lbs. was found to

be practically useful in boiling straw in a caustic alkaline solution to make paper pulp.

"Strong lye" is caustic alkali (fol. 355, Renwick).

Any paper-maker using high-pressure boilers would, upon reading that publication, see that there was a precedent for increasing the pressure to 70 lbs. and upwards.

Plaintiffs' witness, Dr. Rand, referring to this publication, says: "There must be some error in his statement, as straw is "pulped easily with weak alkali at a pressure of 6 atmospheres" (fol. 368).

Six (6) atmospheres would be 70 pounds by the gauge, and Mellier calls for a pressure of from 70 to 84 pounds.

Seven (7) atmospheres would be equal to 84 pounds.

And, see Judge Hall's opinion (Record, fol. 57), from which it appears that the defendants in the case before him boiled the straw at 130 pounds pressure.

It is evident, therefore, that Dr. Rand's assumption that there is an error in the German publication must be rejected.

We have, then, the undisputed fact that there was no novelty in boiling at 70 pounds pressure, and the claim of novelty is thus reduced to the combination of the high-pressure boiling with pure caustic soda of a certain specified strength.

Plaintiffs' counsel (Argument, p. 46), referring to these German publications, says: "They simply say that the result was obtained in England, by some person, by the use of alkali and a high degree of heat, and they name Wright as that person."

On the contrary, the publication refers only to the process, and does not state whether the straw was bleached or not, but only states that in England paper was manufactured from straw by boiling "in a strong lye, under a pressure of steam of from 6 to 8 atmospheres," and Wright's name is mentioned only in connection with a statement that he had made on a large scale "the *better* sorts of paper from *straw alone*, without any *addition of rags*."

And so he had, to the extent of 15 tons a week (fol. 410, q. 83), by boiling in alkali under a pressure of 50 pounds, but it

was "brown" paper, not the "*finer* sort" of paper which the German writer adverts to.

Probably the operations with straw to make pulp for *white* paper were with a higher temperature.

Wright had used 80 pounds (fol. 401, q. 39).

Plaintiffs' counsel further argue (p. 13) that the German publications did not teach the "paper-makers how to manufacture paper by the use of high pressure and alkalies—they amount to nothing except the statement of the fact that, somebody, in some other place, does a thing in some manner, but *the manner* is not pointed out. *Mellier's specification is definite as to strength of alkali and amount of pressure*, and contains nothing arbitrary and indefinite."

And yet, when it is shown that a party does not use that *definite* strength of alkali, nor that *definite* amount of pressure, he is still charged with infringement.

We find that whenever the plaintiffs are forced to define in any way the limits of their patent, they are compelled to lay down what is entirely inconsistent with the claim that the defendants infringe.

Plaintiffs' counsel say that, in the publication referred to, "the *manner* is not pointed out" for using high-pressure steam and alkalies. There could be no occasion for pointing out the manner of using high pressure—every pulp-maker would know how to use it—merely setting his safety-valve to blow off at a higher pressure than before.

And, as to the manner of using alkali in combination with high pressure, we are told by plaintiffs' counsel that it does not signify whether the defendant uses strong or weak alkaline solutions, for, so long as he boils "under pressure," he infringes the Mellier patent.

Sometimes that proposition is qualified by saying that there is an infringement by the use of about 56 pounds pressure, but at other times (and generally) it is assumed, that a boiling in a caustic alkaline solution at any degree of pressure is an infringement.

This German publication is conclusive against the claim of novelty for the mere use of 70 pounds pressure in boiling straw with caustic alkali. And that is, in fact, the whole of the ground-

work of the Mellier patent, upon which it was sustained by Judge Hall, he not having the evidence before him showing the want of novelty in the use of high pressure.

If the words 70 lbs. pressure are to be read to mean 55.$\frac{3}{10}$ by the gauge, then we have proof of the use of 70 lbs. pressure *in the U. S.* prior to the Mellier patent (see Point 23).

We do not cite the German publication for the purpose of showing that it anticipates the *combination* described in Mellier's patent.

We cite it solely for the purpose of showing that he was not the discoverer or inventor of *one feature of the process* (which Judge Hall supposed him to have discovered), viz., the use of steam pressure as high as 70 lbs. for the reduction of fibrous material to pulp, by a boiling with a solution of caustic alkali.

And the patent of Watt and Burgess (which was not in evidence in this case before Judge Hall) is decisive of that question.

Mellier's patent must stand or fall upon the merits of the combination of means or contrivances described by him.

And the first question is, whether there is invention enough to sustain the claim for the described combination.

We hold that this question must be answered in the negative.

1. There was no novelty in the idea that 70 lbs. pressure should be used.

2. There was no novelty in the use of a solution of caustic alkali of any kind, strength or quality.

3. A patent could not be granted for the mere use of caustic alkali of the strength of 2° to 3° B.

4. Nor for the use of "pure caustic soda" in combination with steam pression boiling.

But, 5, we concede that there is no proof of want of novelty in the manufacture of pulp for white paper from straw, by a *single stage process*, consisting of the use of a pressure of at least 70 lbs., with a weak solution of pure caustic alkali, *i. e.*, of the strength of 2° to 3° B.

Mellier asserts that by that combination there is a *saving* of alkali in the pulping, and a saving of chlorine in the bleaching process, *i. e.*, a saving as compared with the quantity of alkali and bleaching powders that would be required in a process where there is no preparation of the straw for the pulping-boiler, no previous elimination of the acid, gummy and worthless matter which neutralizes alkali, and where the boiling is at a low pressure.

It is to be observed that when alkali restoring apparatus (such as that called for by Coupier's patent of 1851—fol. 654) is used it may be more advantageous to use a strong rather than a weak alkaline solution, and in that case a pressure as high as 70 lbs. may be beneficially dispensed with.

Most of the French and English patents (the Coupier and Mellier French patent of May, 1851, is an exception) calling for high pressure boiling in caustic alkaline solutions, to reduce materials to paper-pulp for white paper, require the material to be partly reduced to pulp and cleansed *before* the application of the caustic alkali (which was an expensive material).

The questions then arise :

1. Whether the patent sufficiently shows that the alleged invention consists in the combination resulting in the one-stage process described?
2. Whether there could be a patent for that combination?

We hold that the patent is invalid for want of invention.

As there was no novelty in boiling in caustic alkali, none in boiling at a pressure of 70 lbs. and upwards, and none in the use of pure caustic alkali, the patent cannot be sustained merely because the patentee elected not to prepare the material for the close boiler and caustic alkali.

When the material is prepared for the close boiler more material can be got into the boiler, and it requires a lighter treatment than the crude material would.

Mellier preferred the supposed advantages of a single handling of the material and a more severe treatment.

There was no invention in that, no more than there would be in applying an old process to a new material. As to which see *Curtis on Patents*, section 53, and illustrations referred to.

A fortiori the proposition cannot be maintained, that the public could be prevented from varying the compound processes in public use; that they could not add to the strength of the alkali, or to the degree of heat used in boiling, whilst substantially using the old compound processes.

Mellier made no Chemical Discovery.

As far as the evidence in this case goes, it negatives the idea that Mellier had made the chemical discovery of the proper proportions of heat and alkali to be applied to straw in the pulping process for which Judge Cadwallader gives him credit, for we find that the complainants themselves use, not 70 lbs. pressure, but 140 lbs. (fol. 430, q. 45), and we also see from Judge Hall's opinion, set forth in the complainant's bill, that the defendants, in the case before him, used 130 lbs. pressure (Record, fol. 57).

The use of 70 lbs. pressure not patentable in any view of the case.

Even if Mellier had been the first to use so high a steam-pressure as 70 lbs. to the inch in boiling fibrous material in caustic alkali, to make paper pulp, that could not have entitled him to a patent for the exclusive use of such pressure.

No one could obtain an American patent for the use of high-pressure steam, of any degree, for the pulping of straw, unless, indeed, he should discover some new effect produced by a specific temperature, as Goodyear did in the vulcanization of India-rubber.

Goodyear discovered that a temperature of 270° to 275° F. was necessary to vulcanize India-rubber; 265° would not answer.

The point made in the defendants' answer (fols. 28, 29) is well taken. Mellier not having discovered any such new effect, had no subject for a patent.

Plaintiff's witness, Rand, shows that there is nothing pecu-

liar in 70 lbs. pressure, for he says, "Diminishing the pressure makes necessary a longer boiling. Below 50 lbs., satisfactory chemical action could not take place" (fol. 374, q. 11).

Witness found in his "experiments from 160 lbs. pressure down to 50 lbs., that as you diminish the pressure you had to increase the time and increase the quantity of alkali" (fol. 374, q. 14).

The witness says he cannot "draw any marked line of temperature below 360° as a point for the alkaline treatment at which this subsequent disintegration by chlorine would not be requisite in the converting of wood into white paper" (fol. 379, q. 37).

Nor can he "name any specific chemical property, so far as disintegrating wood is concerned, which a caustic alkaline solution at a temperature of 300° F. possesses, which is not possessed by a caustic alkaline solution, at a temperature, say 290° F." (fol. 379, q. 38).

Mr. Jenckes, in his argument on the Heft case, in contending that the Watt and Burgess patent for the product was valid, said:

"Could pulp have been produced in 1853 or 1854, under pressure at any less degree of temperature than in 1863? Of course not. *Then there is nothing new in the degree of pressure.* The discovery is in the pulp. That is the invention; that is the marketable article; that is the thing of which paper is made. The discovery does not consist of any natural law under which it is made."

In the case before Judge Hall, the evidence may have warranted the conclusion which he arrived at, viz., that Mellier was the first to use high pressure for the reduction of straw, &c., to pulp. (See remarks, *ante*, page 36, on that subject.)

The Hot Blast Case.

Judge Hall, assuming that Mellier had discovered the use of the high pressure boiling, compares the case to the hot blast case, *Neilson vs. Hartford, Webster's Patent Cases*, 337. Judge Hall says that was a patent "for the application to the blast furnace of air heated to an extreme degree, in a separate vessel, intermediate the blowing apparatus and the point where it enters the furnace;" and he quotes Baron Alderson, who says, "what he really discovered is, that it would be better for you

to apply air heated up to a red-hot heat, or nearly so, *instead of cold air*, as you have hitherto done."

That is not analogous to Mellier's case, for Mellier did not discover (as Judge Hall supposed he did), the utility of boiling under pressure fibrous material to be reduced to paper pulp, The fact, that by boiling at a high temperature in alkaline solutions, the action of the alkali in disintegrating the organic forms of the fibre-yielding materials is greatly increased and made more efficacious, was well known.

If, before Neilson's patent, others had discovered that it was better to apply hot air than cold, that patent would not have been sustained. Neilson gave no particular directions as to temperature. No one could have taken a patent afterwards for using a specific degree of heat.

See, as to Neilson's case, Curtis on Patents, Sec. 133, *et seq.*

The Glycerine Case.

Tilghman *v.* Mitchell, 9 Blatch., 18; 2 Fisher, 518. Wright and Fouche's patent was for decomposing fatty bodies into fat acids and glycerine "*by the action of water at a high temperature and pressure.*" Directions were given to use heat to the melting point of lead.

The defendants used a lower temperature and pressure than that referred to in the specification, a longer time and agitation, and claimed that their process was very superior. 2 Fisher, 28.

The Court held that the lower heat and pressure were within the patent. It embraced *all* high temperatures and pressures.

By a parity of reasoning, Montgolfier and Wright's patents, calling for high pressure, embraced pressure of any degree.

We hold—

1. That a man could not take a patent for an improvement of the pulp by boiling the fibrous material a longer time than usual.

2. Nor for shortening the time of the boiling by increasing the heat.

3. Nor for boiling in a stronger alkaline solution than is usually employed.

4. Nor for diminishing the quantity of alkali used by increasing the time of the boiling.

5. Nor for diminishing the time of the boiling by increasing the quantity of alkali.

6. Nor for the use of any specific strength of a solution of caustic alkali.

As to higher pressures than Mellier's maximum, 84 lbs.

If Montgolfier, Wright and others, who called for high pressure without limit, could be shut off from using 70 lbs. upon the discovery that there is more efficacy in a pressure so high as that than in a lower pressure, it follows that other parties on discovering that there is greater efficacy in a pressure higher than the highest, 84°, referred to in Mellier's patent, could prevent him from using such higher pressure. That is to say, if a patent could be granted to Mellier for the use of 70 lbs. to 84 lbs. pressure (84 lbs. is his maximum), then another person could take a patent for the use of 85 to 95 lbs., and another for the use of 96 to 106, and so on.

Mellier puts 84 lbs. as his maximum. He says: "By means "of submitting the straw or similar fibrous materials to a "pressure of between 70 *to* 84 lbs. on the square inch, inside of "the boiler, I can reduce considerably the proportion of "alkali" (fol. 37).

The highest pressure, therefore, deemed by him to be necessary or *useful* in the process is 84 lbs.

It has been found that a much higher pressure is useful. For wood a pressure of 160 lbs. to 170 lbs. is used by plaintiffs (fol. 372).

A patent has been obtained for the alleged discovery of the utility of a higher pressure than 90 lbs. (See Record, fol. 56.) But it is conceived that such patent is invalid for the same reasons as those which invalidate the Mellier patent.

Point 14.

PURE CAUSTIC SODA—NO NOVELTY.

There was no novelty in the use of pure caustic soda in boiling fibrous materials under pressure to make paper pulp.

The patentee does not claim that there was any novelty in the use of pure caustic soda.

He does not show what it is or how it is to be made—in fact, does not mention it in his specification.

See Coupier and Mellier's patent of 1852 (fol. 643) and Judge Hall's remarks on the use of pure caustic soda (fol. 54).

See Abstract of the Coupier and Mellier patents, French, English and American, with Notes, ante, pages 23, 24, 25 of this Brief.

Also, see note to abstract of Mellier's patent, page 32 of this Brief.

The entire want of novelty in the use of pure caustic soda accounts for the fact that there is not a word about it in Mellier's specification. It is mentioned only in the claim.

As to the alkaline solution called for by the patent, Na°. That is the chemical symbol for Natron or Sodium, oxide of Sodium.

Caustic alkali, at a high temperature readily unites with all acids, coloring matter, silica, &c., in the straw or other vegetable fibrous substances to be treated.

It would be convenient to know the temperature and strength of alkali to combine in treating, for example, a certain quantity of rye straw.

All chemicals combine in fixed and invariable proportions, and if we do not use enough alkali all our acids will not be taken up, and if, on the other hand, we use an excess of alkali, it is a mere waste of material.

The Mellier patent, without announcing any chemical discovery, gives the quantity of alkali required for a certain amount of straw, that alkali being of a certain kind and quality, and used at a certain high temperature in boiling, viz., between 70 and

84 lbs. pressure. Treated in that way, the pulp is to be bleachable with a certain weak solution of chloride of lime.

It is not, however, pretended now that any reliance is to be placed upon the specific details of Mellier's patent; on the contrary, it is contended by plaintiffs' counsel that the use of any strength of alkali and any degree of steam-pressure upon any kinds of fibrous materials is an infringement of the patent.

In that view of the case Mellier's patent does not show any chemical compound, *i. e.*, there is no chemical combination, for chemical compounds are formed of fixed and invariable proportions.

As before observed, the Mellier patent being treated as of no importance in this case, no evidence was taken as to the operations under it.

We have no evidence that the combination of heat and alkali, as given by the patent would produce the desired effect upon straw. The range from 2° to 3° B. appears to have been to provide for the different kinds of straw.

And it may be presumed that wheat straw might require more or less alkali than rye straw or oat straw (wheat straw requires most alkali, fol. 404, ques. 52).

As to the argument of Mr. Jenckes, that it must be presumed that the process prescribed by the patent will produce the result claimed by the patentee, the position is untenable.

In the argument in the Heft case, this point was touched upon (see Mr. Jenckes' Argument, p. 33).

Judge Cadwallader said: "Straw, as I understand, is a "substance which may be wrought into pulp or something suf- "ficiently near it by the graduation of the temperature and "the strength without exceeding three degrees Beaumé. But "I have not seen the proof of it. It seems to be conceded on "both sides, and I suppose the proof is in the record."

Mr. Harding: "Your Honor says it is conceded on both sides; I have seen no evidence of it."

Judge Cadwallader: "I thought it was conceded."

Mr. Harding: "I have seen "nowhere the proof that a strength of *from two to three Beaumé* "*will make straw paper.*"

Referring again to this subject, Judge Cadwallader said (see p. 37) that he thought the Mellier patent could be sustained if the Watt and Burgess patent were thrust aside "provided, always, that his theory of 3° B. to 70 lbs. pressure is verified."

And he added, "If it is not disproved, some *prima facies* are due to his patent."

Judge Cadwallader appears to have assumed or taken it for granted that what Mellier claimed as the result of his combination was actually obtained.

Now, we submit that there is no legal presumption that a patented invention is a successful one, producing the result claimed by the patentee, although the patent is *prima facie* evidence of novelty of the thing claimed as new.

Besides, in this case, Mellier does not announce that he has made any chemical discovery—he merely prescribes the use of a certain degree of heat and a certain quantity of pure caustic soda; he does not declare that a lower heat or a weaker alkaline solution will not produce the required result, or that the use of a stronger alkaline solution or more heat will be a waste of chemicals and fuel, and an unnecessary wear and tear of the apparatus.

No such discovery as Judge Cadwallader attributes to Mellier is claimed by Mellier himself. And it is to be observed that Judge Cadwallader does not confine the patent to the 3° B. and the 70 lbs. pressure, but construes it to cover other pressures and other degrees of strength of alkaline solutions.

On what principle this construction is maintained, or how it is to be reconciled with the theory of the chemical discovery, does not appear.

Judge Cadwallader seems, finally, to have placed the case on the ground that Mellier was the first to use a *single stage* chemical process (as to which see *Points* 24 to 27).

As far as the evidence in this case goes it negatives the idea that Mellier had made the chemical discovery of the proper proportions of heat and alkali to be applied to straw, in the pulping process for which Judge Cadwallader gives him credit; for we find that the complainants themselves use not 70 lbs. pressure, but 140 lbs. (fol. 430, q. 45), and we also see from Judge Hall's opinion set forth in the complainants' bill, that the defendants, in the case before him, used 130 lbs. pressure (Record, fol. 57).

Point 15.

THE PATENT NOT GOOD FOR THE COMBINATION.

There being no novelty in the process of boiling fibrous materials in a caustic alkaline solution at 70 lbs. pressure, and no novelty in the use of caustic alkali (whether "*pure*" or otherwise) in the pulping process, there could be no patent for a process merely combining those two things with the use of a specified strength and quality of the alkaline solution, unless at all events there is a discovery of a chemical compound, a combination of heat and alkali, whereby we have the proper quantity of alkali necessary to unite with the acid in the straw, so that an excess of alkali would be waste.

And there is no proof that the Mellier patent shows such a combination.

That there was no novelty in the idea that there was an advantage in the use of a steam pressure as high as 70 lbs., in boiling materials in caustic alkali for paper pulp, is conclusively shown by the German publication before referred to, and by the patent of Watt and Burgess.

And if by 70 lbs. is meant $55\frac{3}{10}$ lbs. by the gauge, then we have proof of the use of that pressure in the United States.

(See Point 23.)

Even then, if the discovery of the utility of 70 lbs. pressure had been a patentable matter, Mellier, not having been the discoverer, could not have obtained a patent for it.

It may be contended, however, that his patent is for more than that, viz., for the use of that pressure in *combination* with the use of a specified strength of a solution of caustic alkali of a certain quality, and that he (impliedly) dispenses with all auxiliary chemical or mechanical processes or agencies beyond the simple preparation of the straw, by cutting it up, soaking and washing it, and thus there was to be but a single stage chemical process.

Point 16.

SPECIFICATION INDEFINITE FOR COMBINATION PATENT.

The patent does not sufficiently define the alleged novelty of the invention as consisting in a combination and the reduction of the pulping process to a single stage.

If the patentee intended to rely upon the supposed novelty of the single stage process as the result of the combination of a high degree of heat with a smaller quantity of alkali than would suffice for a single stage process with a lesser degree of heat, he should have stated in his patent that the invention consisted in that combination.

The patentee is bound to tell the public what his invention really is.

Even if there be no willful concealment, for fraudulent purposes, a patent is void if the specification do not state in what the improvement consists, in full, clear and exact terms.

Lowell *vs.* Lewis, 1 Mass., 188.
Evans *vs.* Hattick, 3 Wash. C. C. R., 408.

Where a patent is for a combination it should so state, and should not be worded so as to give the public reason to infer that the patentee claimed the several parts of the combination as new.

(A reissue is required in such a case.)

Hovey *vs.* Stevens, 3 Wood. & Min., 28.
1 Wood. & Min., 302.

No one reading the Mellier patent would be able to see that the invention claimed consisted in the alleged novelty of a combination of the several particulars therein specified.

Point 17.

CONFLICT BETWEEN THE WATT AND BURGESS AND MELLIER PATENTS.

Unless the Mellier Patent is merely for a combination, it is invalidated by the Watt and Burgess Patent.

The Watt and Burgess patents, as reissued, cover the boiling of straw in any solution of caustic alkali, at any temperature near to or above 300°.

Burgess says: "I consider the reissued patent, 1,449 (the process patent), embraces the Mellier patent" (fol. 223, q. 105).

If the Watt and Burgess patent be valid, the Mellier patent, being of a subsequent date, is void, unless it be sustained as a patent merely for an improvement consisting in the combination discussed in point , ante .

Point 18.

COMBINATION—INFRINGEMENT OF.

If the patent be valid as a combination patent, it is not infringed by the use of part of the elements of the combination.

If the patent is to be treated as a patent for the described combination, it cannot be pretended that the patent is violated by the use of any one or more of the elements of the combination without using the whole.

Thus if straw be boiled in caustic alkali of the strength of 10° B., at a pressure of 70 lbs., to reduce it to pulp, the patent is not violated.

So if the alkali be of the strength of 1° B. only, or be not of the quality called for by the patent.

So if the pressure be used, not for several hours, as the patent calls for, but for a short time only;—the real disintegration being effected by a boiling for a long time at a lower pressure than 70 lbs.

So if the disintegration be effected by a compound chemical process, consisting of several stages and operations.

There is no infringement unless all the elements of the combination are used.

Prouty *vs.* Ruggles, 16 Peters, 336.
Ritch *vs.* Close, 8 Blatchf., 41.

Point 19.

MEANING OF 70 LBS. PRESSURE.

The patent referring to 70 lbs. pressure, and directing the operator to work by the gauge, does not mean $55\frac{3}{10}$ lbs., but means 70 lbs. by the gauge and the use of that pressure substantially as prescribed in the specification.

This is not a scientific question, it is simply a question of legal construction.

The language of the Patent.

The language of the patentee, bearing upon this question, is as follows:

"The improvement consists in subjecting straw or such other fibrous materials to a pressure of *at least* seventy pounds on the square inch, when boiling such fibrous matters in a solution of caustic alkali." * * *

"I prefer that the boiling should be carried on at a temperature to produce at or above eighty pounds on the square inch in *the boiler where are the fibrous materials to be acted upon.* But so high a temperature is not absolutely necessary; for I have found, by experiment, that it is essential that a temperature equivalent to *seventy pounds* on the square inch *must be employed.*" * * *

"The straw, or fibrous materials, and a weak solution of caustic alkali are then to be placed in a suitable close boiler, heated by steam, as hereafter explained, and the heat is to be raised to such a degree as to attain and maintain for a time a pressure, *internally of the boiler*, equal to or *exceeding seventy pounds* on the square inch, that is, *about* 310° of Fahrenheit, by which means a considerable saving of alkali, as well as time and fuel, results."

* * * "By means of submitting the straw or similar

fibrous materials to a pressure of between seventy to eighty-four pounds on the square inch, *inside of the boiler*, I can reduce considerably the proportion of alkali." * * *

"I find it desirable to keep up the heat and pressure during about three hours after the pressure above mentioned has been obtained, when the process of boiling is complete. A *steam gauge*, properly fixed upon the boiler, will enable one to ascertain when the pressure has attained the required degree. When the apparatus and the fibres under process have been cooled by the means hereinbefore mentioned, or *rather when the pressure has been reduced to nothing*, I open the man-hole of the boiler, empty the materials in suitable vessels," &c.

The *claim* does not mention pressure, but requires the boiling to be "*at a temperature* NOT LESS *than* 310° *F.*"

The Atmospheric Pressure.

The witness, Rand, argues that Mellier, in speaking of 70 lbs. pressure, referred to a pressure which included the atmospheric pressure, because "in France, in stating pressures, the total in-
" ternal pressure in the boiler is given, which is about 15 lbs.
" greater than that indicated by the safety-valve or gauge used
" in this country, which indicates the pressure *above* that of the
" atmosphere" (fol. 190, q. 46).

This is an American patent, and when it speaks of steam pressure it should be construed to mean steam pressure above atmospheric pressure, "this being the *universal meaning of the term steam pressure in this country.*" That is admitted by plaintiff's expert, Dr. Rand (fol. 169, q. 8).

Pulp-makers would understand the reference to 70 lbs. pressure to mean gauge pressure, as they have no means of judging the temperature of the liquid they boil in except by the gauge showing the steam pressure. (*See the testimony of plaintiffs' witness, Burgess* (fol. 240, q. 166). "Is there any practicable mode by which " the paper-maker can determine the temperature of
" the liquid in which he boils vegetable substances under pres-

" sure, except by noting the steam-pressure in the pulping-
" boiler, or in the feed-boiler, making due allowance in the
" latter case?"

A. "I am aware of none; I refer to a practical operation."

Frivolousness of Plaintiffs' claim.

The claim of the plaintiffs that the patent prevents the use of a pressure above $55\frac{3}{10}$ lbs. is frivolous and vexatious; the fact being that the use of a much higher pressure is necessary for the single-stage process. In practice a much higher pressure is used. See Judge Hall's remark, that the defendants, in the case before him, used a pressure of 130 lbs. (Record, fol. 57). And see testimony of Keen, that he never worked less than 140 lbs. at plaintiffs' factory (fol. 430, q. 45). He speaks of working straw as well as wood (fol. 431.)

It is like the claim under the Watt and Burgess patent, to prevent any one from using a temperature of about 300° F., *i. e.*, about 50 lbs. pressure in pulping wood (fol. 395), by a compound process, although the witnesses for plaintiffs—the experts—testify that for the single-stage process it is necessary to use 140 to 150 lbs. pressure (fol. 224).

Definite versus Indefinite Expressions.

The *claim* of the Mellier patent is for *the within described process*, and adds that the temperature must be "NOT LESS than 310° Fah." It is not less than 310° Fah. when the pressure is 70 lbs., which represents a higher heat than 310° F., and that higher heat is required by the specification. The specification requires the pressure to be "*at least* 70 *lbs.* on the square inch," and states that the improvement consists in that (amongst other things). In another place it is said that the pressure is "equal to or exceeding 70 lbs. on the square inch; that is ABOUT 310° of Fah."

The specification is thus *definite as to the pressure*, but somewhat *indefinite as to the temperature*, and the operator is referred by the patentee to the *gauge*, and not to a *thermometer*.

It will not do now for the assignees of the patentee to contend that there is a discrepancy between the *exact* pressure and

the *approximate* temperature referred to in the specification, and therefore that the party taking the former as his guide (everybody has so taken it) is to be deemed a trespasser.

The idea of plaintiffs' counsel is that the greatest expansion is to be given to every loose expression in the specification so as to make the patent as broad as possible.

We, on the other hand, maintain that the law, as settled by an unbroken series of decisions, is, that clear, specific information must be given in a patent, so that the public may be warned not to trespass on the rights of the patentee. Neither ambiguities nor vague convertible terms are allowed (see Point 7).

"*Internally of the Boiler.*"

The words "*internally of the boiler*" were designed only to indicate that the pressure inside of the boiler, containing the straw to be boiled, was referred to, and not the pressure of steam in the jacket or in the coil of tubes in the separate compartment of Mellier's peculiar boiler, and for which boiler the first claim in his patent is made. The expression "internally of the boiler," indicates that the gauge should test the pressure upon the material under treatment, and not the pressure in the boiler supplying the steam, nor the pressure in the steam-pipes in a separate compartment of the pulping boiler, which pipes were to be inserted to avoid diluting the alkaline solution.

Thus the specification states that the pressure is to be "in the boiler where are the fibrous materials to be acted on," *i. e.*, in that part of the boiler where the materials are—not in that part of the boiler containing the steam, the "jacket around the boiler" or the steam-pipes in it.

Again, the specification speaks of the pressure "70 to 84 pounds on the square inch *inside of the boiler*," not in the jacket, &c.

There is a difference between the temperature in those two places caused by the cooling of the pulping boiler by radiation.

Moreover, for another reason, the steam gauge attached to the *inner chamber* of Mellier's boiler where the mass was being

boiled in a solution of caustic soda of the strength of 3° B. would mark a lower pressure than that of the steam, in the steam chamber, as water will boil at 212° F., in an open vessel, but a liquid of the density of 3° B. will not boil at 212° F. Temperatures of solutions increase with the densities (fol. 216, q. 62).

By increasing the strength of the solution of caustic alkali a heat of 380° can be obtained, the solution remaining liquid without any pressure (fol. 376, qs. 25, 31).

Judge Cadwallader erroneously assumes that the expression "internally of the boiler" is a *French* expression, and deduces from that the conclusion that the American patent is to be construed by the words used in Mellier's French patent, in which he mentions a pressure of 5 or 6 atmospheres.

The words quoted are not a French expression.

In Spofford's American patent of 1840, for a pulping-boiler, it is stated that the boiler should be made "strong enough to resist any *internal pressure*" (fol. 671).

Mellier's *French* patent cannot, with propriety, be invoked to interpret the meaning of the words used in an American patent, as they are used for the guidance of American citizens.

Moreover, it is to be observed that whenever there is a reference to so many *pressures of atmospheres*, the atmospheric pressure must, of course, be reckoned as one of them.

In the original draft of a specification filed by Mellier in the Patent Office, October 30th, 1856 (and afterwards canceled), there is the following passage:

"The steam introduced will, by condensing in the pipes F "G, heat the *mixture inside the boiler*, and the opening of pipe "H I will be regulated by a cock, so as to let the water of con- "densation out and not the steam" (fol. 449).

And the measure of the pressure "inside of the boiler" is to be taken, *i. e.*, in the inner part of the boiler where the straw and alkaline liquor are placed.

Temperature—how ascertained.

Judge Grier refers to Burgess' testimony, that the only practical method of determining the temperature of the liquid

is by noting the *pressure* on the boiler (fol. 240, p. 166), and he held that the defendants did not use the minimum pressure, as they did not use over 60 lbs. pressure.

Judge Benedict adopts the opinion of Judge Cadwallader, and says, that by 70 lbs. is meant $55\frac{3}{10}$ lbs. by the gauge. He says: "It is quite evident, I think, that the patentee, in mentioning 70 lbs., had in his mind the *French* tables, which differ from the American tables, and according to which the weight of one atmosphere, $14\frac{7}{10}$, must be deducted to give the gauge pressure intended to be indicated."

As the defendants occasionally used 60 lbs. pressure—40 to 60 lbs. as shown by the gauge—Judge Benedict held that they infringed the Mellier patent.

The patentee, whenever he has occasion to mention any degree of *temperature*, refers, not to the thermometer used in France, and generally throughout continental Europe, to determine the gradations of temperature (The *Centigrade*), but to that used in England and America (*Fahrenheit's*); and it would be a singular interpretation of his language when he refers to *pressure, in pounds*, as indicated by the steam-gauge, to hold that he intended by that reference, some gauge (unknown in practice in this country), *graduated by atmospheres* and not in any way *recognizing pounds*.

The reason of the prominence given to pressure in the specification, was doubtless the ease with which the amount of *pressure* could be ascertained by the steam-gauge, whilst to ascertain the temperature a calculation of the density of the solution would be required in addition to the reading of the guage.

Resumé.

We have, then, in the specification:

1. Directions to use a pressure *not less* than 70 lbs.

2. Directions to use a temperature *not less* than 310 degrees *Fahrenheit.*

3. A statement that 310° is *about* 70 lbs. pressure.

4. Where temperature is referred to, the English scale, Fahrenheit, not the French scale, centigrade, is mentioned by Mellier.

5. Proof by plaintiffs' own witness Rand as to the universal meaning of the term "steam pressure" in this country.

6. Proof by plaintiffs' witness Burgess that paper-makers had to work by the gauge.

7. The fact that up to a recent period the patentee and those claiming under him held the patent to be for 70 lbs. gauge pressure.

The true construction of the specification is that the words "*at least* 70 lbs. on the square inch" are not *superseded* by the intimation that a temperature of *about* 310° would be equivalent to that, nor by the intimation that the *temperature* must be *at least* 310°, especially as the operator is instructed that *at least* 70 *lbs. pressure* is necessary, and is directed to work by the *gauge*, and not by a *thermometer*, and the working by the gauge afforded the only *practicable* way of noting the steam pressure in the pulping boiler.

According to Rand's table (fol. 395), a pressure of 70 lbs. would be 319° F. That is "*about* 310°." Burgess says, that 290° is "near 300°" (fol. 214, q. 4; and see fol. 384, q. 73).

The present claim an Afterthought.

The construction now contended for by the plaintiffs is a mere afterthought.

In the case before Judge Hall, all the witnesses, the counsel and the court understood the patent to refer to 70 lbs., as shown by the gauge. This fact is referred to by Judge Grier in his opinion in the Philadelphia case.

Everybody so understood the patent, and now the plaintiffs bring suits against parties who in practice use only 40 lbs. or 50 lbs., and the plaintiffs rely upon being able to show that occasionally the steam runs up to 56 lbs., and upon the strength of that evidence the plaintiffs claim a decree for an injunction; at the same time contending that the patent covers all boiling

of all kinds of fibrous substances under any degree of pressure in any caustic alkaline solution of any strength. In this way the paper manufacturers are harassed and forced into compromises with the plaintiffs.

Legal rule of construction of Patents.

We hold the rule of law to be that where the terms of a patent are obscure or ambiguous, that construction is to be put upon it which is most favorable to the public, and not that which is most favorable to the patentee.

Coryton on Patents, p. 135, "Every patent" says Dallas, J. (Campion *v.* Benyon, 3 B. & B. 5), "being a monopoly, that is an infringement of public right, and the specification having for its object to give the public warning of the precise extent of the privilege conferred on the patentee, the Court is bound to require that such warning should be clear, and accurately describe what the inventor claims as his own."

The patent ought not to be construed so as to work a deception on the public. The specification is required "so that "the public may know what they are prohibited from doing "during the existence of the monopoly."

Per Cur., Brookes v. *Fiske*, 15 How., 215.

Point 20.

Minimum Pressure.

The Patent is not infringed by the use of a pressure less than that specified as the minimum.

It is to be observed, in the first place, that Mellier himself says, "I would have it understood that I do not claim the gen- "eral use of caustic alkaline solutions, nor the employment "generally of a close boiler."

That is to say, he does not claim, generally, the boiling in caustic alkali under pressure, which claim is now set up in his name.

Assuming the patent to be valid, if,—one should use pure caustic soda in a solution of the exact strength prescribed by the patent, still the patent would not be infringed unless the other element in the combination, viz., at least 70 lbs. steam pressure, should also be used.

Judge Benedict treats Mellier's patent as not limited to the 70 lbs. pressure, stated in the specification to be necessary, nor even confined to the minimum temperature of 310°, although the claim states it must not be less than that.

He assumes that the temperature is to be not less than "*about* 310°," but gives no reason for the opinion that the words "*not less* than 310° " are to be disregarded.

Even if Mellier had been the first to discover the advantages of boiling in caustic alkali under pressure, his patent could not be construed so as to make it a patent for the use of a lower pressure than that which he says "must be employed," and the use of which pressure, in combination with other particulars, he declares to be the improvement for which he obtains the patent.

Even if he had been the first to boil under pressure of any kind, it may be questioned whether he could, upon a reissue, embrace a lower pressure than that claimed by the patent, viz., 70 lbs. In the absence of such reissue, the patent must be confined to the precise limits defined therein.

We submit that Judge Cadwallader errs in his opinion that it should be assumed.

1. That Mellier was the first to use the single stage process.

2. That he was therefore entitled to a patent without limits as to the steam pressure—the strength or quality of the alkali —the materials to be treated or the time of boiling by a single stage process.

3. That the patent is to be read as if it had actually been obtained in that unlimited form.

Point 21.

The Patent confined to Straw. Bamboo is not Straw.

The patent is confined to straw; Mellier having for special reasons chosen to confine his *claim* to straw, although the specification pointed out that similar fibrous materials could be treated in the same way. * * * * * *

The argument of plaintiffs' counsel in the Court below, and his printed points, and the testimony of plaintiffs' witnesses (the experts) confine the Mellier patent to *straw*, treated with a caustic alkaline solution of a strength of 2° to 3° B.

But in the Philadelphia case, argued afterwards, plaintiffs' counsel did not confine the Mellier patent to straw, but sought to expand the claim by reference to the specification.

The second claim of the patent is confined to the described process "for bleaching *straw*."

The monopoly granted by a patent can never be greater than that embraced in the claim.

The claim cannot be enlarged, although it may be limited and reduced by the specification.

Remedy by Reissue.

If the patentee desires to extend his claim, he may obtain a reissue; and then, if he makes the claim extend to all vegetable fibrous substances requiring the same treatment as straw, he will have to encounter the objection that it is too broad, inasmuch as other fibrous substances had been treated by paper-makers in the United States substantially in the way described before the alleged invention of this patentee.

Why confined to Straw.

Mellier may have had very good *reason for confining his claim to straw*, seeing that hemp, flax, *rope with coarse shives, cotton seeds, &c., had been commonly treated in close boilers* in various ways in the United States, whereas straw had *usually* been

treated in open kiers, and but comparatively little white paper had been made from straw.

See the correspondence with the Patent Office. Mellier offered to take a limited claim. See Record, fol. 453 and ante page .

He did not choose to risk his patent by claiming too much. Although he considered that his process might be applied to other fibrous vegetable substances requiring the same treatment as straw, he preferred not to extend his claim to them. He probably *knew* that some of them had been subjected to similar treatment, and was content if he could get a patent for the treatment of straw in that particular way.

Plaintiffs' witness, Rand, says: "The claim of the Mellier patent refers to straw alone" (fol. 383, q. 67).

After the close of the argument in this case in the Court below, another case was decided by Judges Grier and Cadwallader. Then the plaintiffs' counsel in the present case shifted their ground and took the position that the Mellier patent was not confined to straw, and contended that bamboo is straw.

That was after arguing and proving that bamboo is wood.

Judge Benedict, speaking of bamboo, says, "the stalks of this plant, which is the gigantic *grass* of the tropics, belonging to the same botanical order as wheat, oats, &c."

It does not signify in this case on what order the bamboo is classified by botanists. Under the genus "Felis," Linnaeus classes the lion and the cat. And men, monkeys and wolves, bats and whales are all embraced in the same class ("Mammalia"). The bamboo grows 60 feet high. It is wood, and it is not straw, within the popular signification of that word as used in the patent.

The plaintiffs' expert, Dr. Rand, says, that the pulp made by the defendants was made from bamboo, a species of wood (fols. 174, 178).

Mellier probably referred to "herbaceous" materials, which were referred to in the Coupier and Mellier patent (fol. 654), in connection with straw,—thus "straw and all *crude* or new herbaceous matters."

"Herbaceous plants are such as perish annually down to

the root; soft, succulent vegetables" (Webster's Dict., "Herbaceous").

Judge Benedict says that the bamboo, disintegrated and prepared by defendants' process for the pulping boiler, is certainly a fibrous vegetable substance requiring the same treatment as straw, and "is in form and substance so very like to the common straw, that it must, in my opinion, be held to be within the scope of the Mellier patent."

We maintain, on the contrary, that the bamboo disintegrated by the steam-gun, and reduced to pulp ready for the pulping-boiler, is a manufactured fibre, not at all like straw. It *is like oakum.*

Judge Benedict speaks of the steam-blown material as being merely shivered into a mass of tendril-like shreds or strips, very like a mass of straw. He overlooks the fact, that the resinous matter is rendered *soluble.* It is therefore, in "*substance*" very different from straw.

The summing-up in the claim is binding as a limitation of the patent.

Moody v. *Fiske*, 2 Mason, 118, per Story, J.

"It appears to me clear, both upon principle and authority, "that where a patentee in his specification states and sums up "the particulars of his invention, and his patent covers them, "he is confined to such summary."

Wyeth v. *Stone*, 1 Story, 288.

"It is the duty of the patentee to sum up his invention in "clear and determinate terms, and his summing-up is conclu-"sive upon his right and title."

Whitney v. *Emmett*, 1 Baldwin, 313.

"The disclaimer, at the close of the specification, estops "the patentee from setting up any privilege to the part dis-"claimed, and *the summary is equally binding on him as a limita-"tion to the thing patented.*"

Parker v. *Sears* (per Grier, J.), Pa., 1850, Law's Digest, 522.

"If an inventor sums up the particulars of his invention, he "is confined and held to such summary, and his patent must "stand or fall by it."

American Pin Co. v. *Oakville Pin Co.*, 3 Am. Law Reg., 138, per Ingersoll, J.

"The patentee may, however, limit his claim in his specifica- "tion to one particular form of machine, and thus exclude all "other forms, though such other forms would embody his in- "vention and thereby not secure to himself the whole that he "has invented. In such a case he is secured only in the par- "ticular form claimed. The patent law was intended to secure "to the inventor his whole invention or discovery, but *not* "*unless he claimed to be secured in the whole.*"

The cases show that the specification may be referred to for the purpose of *limiting* the claim, so as to prevent its being declared void as being too broad, but not for the purpose of making the patent extend beyond what it is in plain terms confined to in the claim.

See *Brookes* v. *Fiske*, 15 How., 215.
Winans v. *Denmead*, 15 How., 341.
Turrill v. *Railroad Co.*, 1 Wallace, 491.

The construction is such "as to uphold and not to *destroy* the right of the inventor."

It would be very prejudicial to the interests of the public to allow the claim of a patent to be metamorphosed by a reference to the detailed specifications. Inventors and the public at large are compelled to judge by their examination of the claims.

There are scores of patents for treating different kinds of vegetable fibrous substances. Some patentees select reeds, some bamboo, others esparto grass, others diss, others straw, and others wood, &c., &c. In searching the patents, it is always assumed that when a patent is taken for treating a specified material, and no other is mentioned, the monopoly is confined to the thing specified.

The claim in this patent is clear. The specification cannot be referred to for the purpose of making it something different.

A specification can only be referred to for the purpose of *aiding in the interpretation of a claim*—not for the purpose of making the claim extend to something not mentioned in it and embraced within the grammatical and legal meaning of the words employed in the description of what the patentee elects to ask a patent for.

As observed by plaintiffs' counsel in the Philadelphia case, Mr. Jenckes' printed argument, p. 124, "no matter what a man writes in his patent, his claim is what you look at." When that is clear, it cannot be expanded by the specification.

As to Plaintiffs' proposition that Bamboo is Straw.

In the argument of this case in the court below, the plaintiffs' counsel, Mr. Jenckes, explaining that the Watt and Burgess patents applied to wood, and the Mellier patent only to straw, said:

(Jenckes' printed argument, page 2.)

"The bill covers patents for the manufacture of paper pulp from *straw*. That process I will explain hereafter, but the principal infringement complained of is the patent for the manufacture of paper from *wood*. The defendants, instead of using the common *wood* of our forests, use the *giant cane*, commonly called bamboo, of the West Indies."

The bamboo *pulp* from which defendants make bleached paper is not a material embraced by the patent.

Before being boiled in caustic alkali under pressure, it was disintegrated by the steam-blowing process, and further treated in an open tank so that *brown* paper could be made from it *without subsequent chemical treatment* (fol. 174, q. 17, *Rand*).

In construing this patent, we have to take the popular acceptation of the word straw. And that does not embrace banboo or wood of any kind.

Webster's Dictionary, "*Straw.*"

"1. The stalk or stem of certain species of grain, pulse, &c., chiefly of wheat, rye, oats, barley, buckwheat and peas."

Point 22.

As to Materials Requiring same Treatment as Straw.

Even if the patent extends to other fibrous materials besides straw, it is confined to such materials as require the same treatment to produce a bleachable pulp by the use of the weak alkaline solution prescribed in the specification.

The bamboo treated by the defendants required and received a different treatment.

As to the application of what is called Mellier's process to materials other than straw—materials "*requiring like treatment*" with straw—we find the theory of Judge Benedict different from that of Judge Cadwallader.

According to Judge Cadwallader, you have only to regard "the *purpose* in view." But that appears to be confounding the purpose with the means of effecting it.

According to Judge Benedict, you have only to see that the materials are treated in any stage of the process in the same way as straw is directed to be treated by Mellier's patent, and forthwith it is evident that they must be materials requiring the same treatment as straw.

That does not appear to be the true meaning of the words "requiring like treatment."

We submit that those words refer only to herbaceous and other substances which can be reduced to bleachable pulp by the same means as those directed to be used for the reduction of straw to pulp, fit for white paper.

When some other treatment is required in order to reduce a refractory substance to pulp before it is boiled in an alkaline solution under pressure, that is not a material to be classed with straw as requiring the same treatment as that by which straw is to be reduced to a bleachable pulp; and which treatment consists merely in the boiling of the straw in a solution of pure caustic alkali of a definite strength at a certain temperature, the limits of the temperature and of the strength of the alkaline solution being clearly defined.

It is to be observed too, that when Judge Benedict says that the defendants treated the bamboo by the Mellier process, he assumes the following propositions :

1. Either that defendants used pure caustic soda (which is not proved) or that it was immaterial whether they did or did not use it.

2. That it was immaterial whether they used an alkaline solution of the prescribed strength.

3. That it was immaterial whether the pressure used was even as high as $55\frac{3}{10}$ lbs.—that the use of "about" that temperature would be an infringement.

4. That bamboo is straw, and that pulp made from bamboo is a fibrous vegetable substance similar to straw and "requiring like treatment."

We submit that each of those propositions is erroneous.

As to the 4th proposition, it is admitted by Burgess (fol. 224, q. 109), that the bamboo pulp, made by the preliminary process of the defendant, is not a vegetable substance within the meaning of his patent.

Rand admits that it may be run off into paper without any further treatment (fol. 174, q. 17).

See Point 10.

Bamboo not a "material requiring like treatment" with Straw.

Even if the claim is to be expanded in its construction so as to include other vegetable fibrous substances not mentioned or referred to in the claim, then it must be confined to "other "*vegetable fibrous materials requiring like treatment*, preparatory "to the use of such fibres in the manufacture of paper." (See the Specification.)

Is bamboo wood a fibrous material, requiring the same treatment as straw?

Let us turn to the evidence of the plaintiff to answer that question. That shows that it would be useless to treat wood in the same way as straw.

It is proved that wood requires more than four times as

much alkali as this specification directs to be used in treating straw, and also requires nearly double the steam pressure which this specification directs to be used.

The alkali to be used is between 2° to 3° B. for straw.

And for straw the pressure called for is "a pressure of be-
"tween *seventy to eighty-four pounds* on the square inch."

The caustic alkali required for wood is of the strength of 12° B. (fol. 212, q. 42).

"For resinous woods, a temperature of the solution of about
"372° F. was *necessary;* for non-resinous woods, a tempera-
"ture of the solution of about 366°" (fol. 224, q. 100).

"We practically use, with non-resinous woods, a pressure of
"about one hundred and forty pounds; with resinous woods, a
"pressure of about one hundred and fifty pounds" (fol. 216, qs. 63 and 64).

Wood, therefore, is not a vegetable material requiring "*the*
"*like treatment*" as straw, as directed by this patent. A treatment which would be sufficient for straw would be useless for wood.

The bamboo could not be successfully treated by the process described in the Mellier patent. It requires a different treatment, and defendants give it a treatment totally different. If the bamboo were cut up and boiled in caustic alkali it would require alkali of 12 degrees strength, and a pressure of at least one hundred and forty pounds, to be properly pulped by a single-stage process.

Judge Benedict holds that the use of what he supposes to be a process *approximate* or *equivalent* to Mellier's, proves conclusively that the material treated by defendants comes within the words of the specification, "other fibrous vegetable matter requiring like treatment." The fact that the material may require a totally different treatment *before* the treatment referred to in Mellier's patent can be applied, he regards as unimportant.

The manufactured article put by the defendants in the alkali boiler does not require a steam pressure exceeding

forty pounds (fol. 264), whereas wood requires one hundred and forty pounds (fols. 216, 224).

The stuff put into the alkali boilers (defendants' Exhibit *K*) is divested of a large proportion of the intercellular tissue, so that it would make paper without any further chemical treatment (fol. 174, q. 17). Being *pulp* it is not within the meaning even of the broad and comprehensive claim of the Watt and Burgess' patent (fol. 224, q. 109, Burgess).

The steam-blowing enables the defendants to wash out the acid and cementing matter; the material is then tractable, a small quantity of alkali suffices for it, and a comparatively low temperature in the boiling to make pulp for fine paper.

The pulp made must be produced by the light alkaline treatment, must be bleachable by the light bleaching treatment specified in Mellier's patent.

The real claim of Mellier is, that straw can, with the weak solution of pure caustic alkali described in the patent, boiled with a pressure of at least 70 pounds for about three hours, make a pulp which can be bleached with a small quantity of chloride of lime.

A party treating some other material in that way—even in that way alone—is not shown to violate the patent, unless it is shown that such material so treated can be bleached in the way described by the patent. If that fact be shown, and not otherwise, it is proved that the material *requires the same treatment* as straw to produce the effect designed by the patent.

That fact could not be shown if wood, for example, were the material treated.

Many fibrous vegetable substances may be reduced to pulp for coarse paper, by a boiling in a weak solution of caustic alkali, under pressure, and it is not pretended that the manufacturers of such an article, by such a process, infringe the patent.

Judge Cadwallader concedes that substances other than straw, to be embraced by the patent, must, according to the patent, be such as require like treatment with straw. But he considers that if the material is wood, requiring three times as much alkali, twice as much heat, and boiling three times as

long, yet that is the same treatment as that prescribed by the patent, if we regard "the *purpose* in view," which is "to obtain cellulose approximately pure."

We maintain, on the contrary, that when the words "requiring the like treatment" are used in the patent, they mean that treatment which the patent instructs the operator to use, as being sufficient to make paper pulp from straw, fit for white paper, and easily bleached, and that those words do not apply to a material which requires substantially a different treatment. As to this question, see Points 2, 7 and 10.

Point 23.

PATENT TOO BROAD.

If by 70 lbs. is meant $55\frac{3}{10}$ lbs. by the gauge, and if the patent applies to all other fibrous vegetable substances besides straw, and is not limited to the use of alkali of a specific strength and quality, then the patent is defeated by showing the prior use in the United States of 60 lbs. pressure in boiling in a solution of caustic alkali, hemp shives and cotton seeds, to make pulp for white paper by a single stage process.

This objection is not removed by the Act of 1837, Sec 9.

See *Point* 8 on the Watt and Burgess patents.

See the testimony proving that in 1852 white paper pulp was made in the United States in a Spofford high-pressure boiler by boiling hemp tow and shives in caustic alkali with steam pressure of 60 lbs. by the gauge (fol. 256, qs. 8 to 16; fol. 317, qs. 10, 11; fol. 324, q. 69).

If we are referred to the opinions of Judges Cadwallader and Woodruff, that it is immaterial what strength of alkali is used, and that it is also immaterial whether the pressure used be less than $55\frac{3}{10}$ lbs., or to the opinion of Judge Benedict, that the use of "about" that pressure is an infringement, then we call attention to the Gros patent, calling for a temperature of "about" 310°.

If, therefore, the patent is to rest upon the supposed novelty of the high-pressure boiling, it fails.

If it rests upon the combination of such boiling with the use of a solution of *pure* caustic soda of the strength of 2° to 3° B, then the patent is open to the objections presented in *Points* 15, 16, 17 *and* 18.

See also *Point* 24, applying the Gros patent as a test of Judge Benedict's opinion, that the use of *about* 56 lbs. pressure in a compound process is an infringement of Mellier's patent.

Burgess (fol. 232, q. 142) says that raw flax and hemp are within the scope of his patent, because the fibres are connected by true intercellular matter.

And Burgess says (fol. 224, q. 107), "unbleached hemp rope and flax come within the category of the vegetable substances included in the patent."

That being so, they are also "fibrous materials" within the meaning of that expression in the body of the specification of Mellier's patent (although not within the *claim*), unless that expression is to be understood as confined to *crude* fibrous materials, the fibres of which are bound together naturally, and which are to be disintegrated by the high-pressure boiling with caustic alkali, described by the patent.

Sometimes the plaintiffs' counsel and their experts put the patent on that ground, and say that is the true meaning of the patent. That is when they are pressed with prior patents;—and in that way they seek to avoid the legal effect of the prior use at paper mills in the United States, of high-pressure boiling with caustic alkali, applied to hemp rope;—contending that it was unlike straw, because the hemp was already reduced from its natural condition to a fibrous state.

We then confront them with their own argument, that any fibrous material which is boiled at $55\frac{3}{10}$ lbs. pressure with caustic alkali, must of necessity be a fibrous material requiring the same treatment as straw, or else it would not receive that treatment!

They are also confronted with their own argument, that the bamboo pulp prepared by the defendants' process prior to its being subjected to high-pressure boiling with caustic alkaline is "fibrous material" within the meaning of the Watt & Burgess and Mellier patents, although the fibres are no longer bound together, but are already disintegrated, so that nothing is required but the action of the rag engine to convert it into coarse paper).

The arguments of plaintiffs' counsel and of their experts in this part of the case are full of inconsistencies and contradic-

tions; a further illustration of which is shown by the testimony of Burgess (fol. 224, q. 109), who admits that if a party shall take paper pulp manufactured from any "vegetable fibres from which paper could be made without any subsequent boiling in an alkaline solution of a temperature above 290°, and shall put that stuff into a boiler and boil it in an alkaline solution under a pressure of 75 lbs.," that would not be treating a vegetable substance within the meaning of the patent No. 1,449 (Watt & Burgess reissued patent of 1863).

The paper pulp made by defendants, ready for the high-pressure boiling, was pulp from which paper could be made after the alkaline treatment in the open tank, at a temperature above 290°" (see fol. 174, q. 17).

And yet plaintiffs' counsel has claimed, and the Court below has decided, that the patent is infringed by boiling in a certain caustic alkaline solution, under a pressure of $55\frac{3}{10}$ lbs., a fibrous material which has been previously disintegrated by the steam gun and boiled in an open vessel in spent alkali, put through a beating engine, *i. e.*, reduced to pulp (see sample, or Exhibit K).

Judge Benedict says that the defendants boiled the steam-blown bamboo "in caustic alkali, under pressure, sometimes having previously boiled it in spent alkali in open vessels, and sometimes not."

The testimony shows that it was *always either boiled or beaten up in a rag engine, and washed* at the same time. One of the two processes was always used (fol. 137, q. 4, fol. 263, q. 3); the intercellular matter and coloring matter, gum, gluten, &c., was either eliminated by the boiling, followed by washing, or by making washed pulp. In either case the material was ready to be made into common paper without any further disintegration; the subsequent boiling in caustic alkali being merely for the purpose of softening the fibre and improving the *quality* of the paper.

It is of no consequence to us which horn of the dilemma the plaintiffs take; whether they hold that hemp tow is or is not a fibrous material within the Mellier patent. If it be not so, on account of the fact that it is not a *crude* fibrous material, which has to be disintegrated by the means specified in the

patent, then we say that for the same reason the material which has been subjected to the defendants' process is not within the patent.

And for another reason the patent is inapplicable, viz., because its alleged novelty consists entirely in its reducing the disintegrating process to a single stage chemical process.

If, however, hemp tow is to be treated as within the Mellier patent, then we say that before Mellier's patent was issued, hemp tow had been converted into paper pulp in the United States for white paper, by high-pressure boiling with caustic alkali; such pressure being as high as 60 lbs. to the square inch, as shown by the English and American gauge.

So that in any event the patent is invalidated by the prior treatment of hemp tow.

Point 24.

PATENT FOR SINGLE STAGE PROCESS.

The plaintiffs' proposition that the prior processes of boiling in caustic alkali under pressure do not invalidate the Mellier patent, because the latter is for a single-stage process—a chemical one—is inconsistent with the proposition, that defendants infringe the patent in using a double or treble-stage process, chemical and mechanical.

We have shown (point 13) the entire absence of novelty in the use of high-pressure boiling with caustic alkali.

Dr. Rand's distinction.

Plaintiffs' witness, Rand, tries to distinguish the early patents from Mellier's and the Watt & Burgess patents, thus;

That it was only by repeated processes that *Wright* made pulp (fol. 180, q. 29, and see fol. 366, q. 56).

That *Coupier & Mellier* "do not produce a pulp directly by boiling in alkali at a sufficient temperature, but rely on the disintegrating effect of the hypochlorites" (fol. 181, q. 31, and see fol. 382, q. 59).

As to *the Gros patent.* He boiled under pressure in an alkaline solution, but "the real disintegration is effected by mechanical means" (fol. 187, q. 40, and see fol. 381, q. 49, fol. 380, q. 41).

Montgolfier and Gros used pressure boiling and caustic alkali, but the "material was not pulped by chemical means" (fol. 189, q. 43, and see fol. 380, q. 41).

NOTE.—The defendants also used "repeated processes," as Wright did.

They also, according to Burgess, relied "on the disintegrating effect of the hypochlorites" (fol. 243, q. 174), Coupier and Mellier did.

And the defendants resorted to "mechanical means" to effect the disintegration, as did Gros and Montgolfier.

Judge Cadwallader on the Single Stage Process.

According to Judge Cadwallader, "Mellier would appear to have been the first person who discovered that the temperature and strength of the solution and the duration of the boiling could in practice be so graduated and adjusted as to produce the pulp *at one operation.*"

Judge Caldwallader infers that the argument of defendants' counsel in that case, that the claim was limited to the use of a temperature not below 310° Fah., was not maintainable.

Judge Cadwallader's reason for that opinion is that the Mellier patent is as broad as the reissued patents of 1863, representing the alleged invention of Watt & Burgess.

And as to that he says, speaking of Watt & Burgess' English patent of 19th August, 1853: "Before this date, and before "any maturity of their previous experiments, a pulp fit for "making paper had been obtained by others from such fibrous "substances as wood and straw through the *use of different* "*processes* for disintegration of the fibres.

"In every such case the process had been one of *successive* "*stages.* The substances had been boiled in an alkali, *strong* "or *weak*, in open vessels and in *close ones under pressure* and "without pressure. The process has never been such as to "produce *the pulp at one operation.*

"In some cases the boiling itself had been repeated. In all "of them, there had, besides mere soaking and cleaning, been "a succession of mechanical or of chemical treatments, or of "both, with applications of heat."

Even if the facts had been as alleged, the legal conclusion arrived at by Judge Cadwallader (and for which he gives no reasons) could not have been sustained. The limitations of the patent could not be swept away, merely because the process was confined to a single chemical stage.

Judge Benedict on the single stage process.

Judge Benedict holds that the defendants infringe the Mellier patent, although they use a two-stage process.

According to his opinion, the use of Wright's patented process, patented in 1843, would be a violation of the Mellier patent.

He says, "the principle of the Mellier discovery was that "the effect of a solution of pure caustic soda upon certain vege- "table substances could be increased by the use of it under "pressure at a temperature not less than about 310 degrees, "so as to result in the production of the nearly pure fibre *with- "out resort to any other chemical process*, thereby saving both "alkali and time.

"The *final process* used by the defendants is, as I under- "stand the evidence, a process which invokes the same princi- "ple to produce the same result, and in substantially the same "way. If this be so, they do not escape the patent by a pre- "vious shivering of the material into shreds, or by a previous "boiling it in an open vessel in spent alkali, or by putting it "through a beating-engine. The material so previously treated "is still a fibrous vegetable substance, requiring to be treated "by the Mellier process to produce the pulp desired, and when "the defendants apply that process to it they infringe."

Judge Benedict here treats the Mellier patent as the plaintiffs' experts do, and as Judge Cadwallader did, as a patent for a single stage chemical process, viz., a boiling in a solution of caustic soda under pressure "*without resort to any other chemical processes*," and yet holds that *when there is a resort to other chemical processes*, the patent is violated, because "the *final process*" is part of what is described in Mellier's patent.

The Judge holds that the defendants "do not escape the "patent by a previous shivering of the material into shreds, or "by a *previous boiling* it in open vessels in spent alkali, or by "putting it through a *beating-engine*," by which it is reduced to paper pulp, *before* being boiled in caustic alkali under pressure.

What, then, becomes of the proposition that the patent is for a single-stage chemical process, *wherefore it stands unaffected by prior patents which called for other operations besides that of boiling in caustic alkali under pressure.*"

As to "a previous shivering of the material into shreds," Judge Benedict is in error in supposing that to be the only effect of the process with the steam gun, for the resinous matters in the material are thereby rendered *soluble*, and they are boiled or washed out before the alkali treatment.

Judge Benedict's doctrine contrasted with Judge Cadwallader's.

According to this decision, any one using any of the old compound-processes of Wright, Montgolfier, Gros, &c., would violate Mellier's patent.

We concede that one cannot use another's invention by merely blending it with something else. But when the alleged invention consists in reducing two or more processes to one, a party cannot be prevented from using two or more processes, because they include the single-stage process of the patent.

Thus Wright's patent calls for the following process:

1st. Boil the straw in a solution of lime.

2d. Beat it up and wash it.

3d. Boil the product in caustic alkali, in a close boiler, under high steam-pressure.

This, the plaintiffs contend, does not invalidate the Mellier patent, because under that patent the straw is not subjected to the double-process, which is dispensed with by the use of high-pressure in combination with the pure caustic soda.

And yet plaintiffs contend that if any one should now use that process of Wright, with seventy pounds pressure, he would violate the Mellier patent—nay, plaintiffs' counsel go farther, and argue that the patent is infringed, although the solution of the caustic alkali may not be the same as that required by the patent, and although the steam-pressure may have been less than seventy pounds, and even less than the pressure corresponding with the minimum temperature mentioned in the patent—that in fact the patent is violated by the mere use of any solution of caustic alkali, boiled under pressure of any degree.

Wright used 50 lbs. pressure, and his patent calls for a solution of caustic soda, on the final boiling, of a strength weaker than that called for by Mellier.

Therefore anyone using Wright's process would, according to Judge Benedict, be violating Mellier's patent, for he would be using about 56 lbs. pressure, and a solution as weak or weaker than that called for by Mellier.

According to Judge Cadwallader, the *whole merit of the alleged invention consists in the use of a single-stage process*, and he concludes that the patent is infringed by a boiling of any fibrous material for any length of time, with any strength of caustic alkaline solution, under any degree of steam-pressure, provided only that all is done at *one operation*. He holds further, that the patent covers wood and other crude fibrous vegetable substances more refractory than straw, and requiring a stronger alkali, a greater heat, and a longer time of boiling, consequently that the patent creates a perfect monopoly of the right to reduce fibrous substances to paper pulp by the use of caustic alkali and high-pressure boiling.

This claim Judge Cadwallader sustains, on *the strength of the supposed novelty and importance of a single-stage chemical process*, which we maintain is no novelty, and, moreover, that it is very inferior to the two-stage processes.

According to Judge Benedict, the patent is infringed by such a boiling in a caustic alkaline solution as that called for by Mellier's patent, although such boiling forms only a small part of the process. He treats the invention as consisting in the use of high-pressure steam of "about" the "temperature" of 310°, in conjunction with caustic alkali, and overlooks the fact that it is clearly proved that there is no novelty in that.

Judge Benedict further holds that to constitute an infringement it is not necessary to show that the alkaline solution called for by the patent was used—proof that the strength was *less* than 3° B., he considers sufficient. According to his opinion, it does not signify how much less than 3° the strength may be.

No reason is given for that opinion.

Test of Judge Benedict's opinion. Gros' Patent.

Laying aside Judge Cadwallader's proposition, that any use of high-pressure boiling, in a caustic alkaline solution, to reduce fibrous material to paper pulp by a *single chemical oper-*

ation, is a violation of the Mellier patent; and taking up Judge Benedict's proposition, that to infringe the patent there must be a use of *about* 56 lbs. pressure, and the use of alkaline solution *about* that called for by the patent, and that it does not signify whether there is a single chemical stage or a dozen, we will proceed to test that opinion by an illustration derived from the Gros patent.

Gros takes wood, moistens it with hot alkaline liquor, crushes it, boils it in caustic alkali under pressure of "about 3 or 4 atmospheres," crushes it again under rollers until it looks like oakum, then subjects it to a second boiling, like the first one, (See ante, page 22.)

According to Judge Cadwallader, the use of Gros' process (it being a compound process) would not be a violation of Mellier's patent, whatever might be the temperature used in the boiling. But, according to Judge Benedict, the use to-day of this compound process of Gros would be a violation of Mellier's patent, because *it includes a* boiling in a solution of caustic alkali at a temperature of *about* 310°.

Gros (fol. 845—see the French, fol. 835) calls for a pressure of about 3 or 4 atmospheres, the alkaline solution being 9° Beaumé (fol. 380, ques 45), 5 atmospheres would come within that description, being "about" 4, and that would be equivalent to a temperature of between 309° and 312° F., according to Rand's table (fol. 395). It would, therefore, come within the range of the Mellier patent, as construed by Judge Benedict.

But, according to Judge Hall, the patent is not infringed unless the pressure used is at least 70 lbs., and the alkaline solution used is precisely that called for by the patent.

As to the single-stage process, see Points 10, 21 to 27.

Point 25.

DOUBLE-STAGE PROCESS.

The process used by the defendants was not a single stage process.

How Defendants made Pulp from Straw for Brown Paper.

Instead of cutting the straw into short lengths, and freeing the same from knots and dirt, and then steeping it, as directed by the patent, the defendants subjected the straw—

1. To the chemical action of heat due to 180 lbs. steam-pressure, and to the explosive force of steam at that pressure.

2. Then boiled the product in a weak alkaline solution (spent or refuse alkali solution), in an open tank.

3. Then boiled in a caustic alkaline solution (strength not shown), steam-pressure 40 to 60 lbs.

4. Exploded the product from the boiler as from the gun.

5. Sent it to Stockport, New York, where it was made into *brown* paper (fol. 263, q. 3; fols. 282, qq. 153, 157, fol. 266, qq. 25 to 28, Townsend, and fols. 316, 317, Howland).

The only notice taken by Judge Benedict of defendants' treatment of straw is the following: "They appear at times to have treated common straw, but their principal article is bamboo, which they use for the purpose of producing from it the desired pulp for the manufacture of their paper."

As to the strength of the caustic alkaline solution, and the quality of the chemical used by the defendants, see Point 27.

How Defendants made Pulp from Bamboo for White Paper.

The defendants' process is described in defendants' answer (Record, fols. 116 and 117), and by defendants' witness, Townsend, thus (fol. 263, q. 3; fol. 282, qq. 153, 157):

1. The bamboo was blown from the steam-guns at 180 lbs. pressure.

2. The fibre was then boiled in waste alkali in an open tub, or, in lieu thereof, was reduced to pulp in a paper-maker's rag-engine, or both processes were gone through before the boiling in caustic alkali, under pressure of 40 to 60 lbs.

As to the strength and quality of the caustic alkaline solution used by defendants in this process, see Point 27.

The steam at 180 lbs. steam pressure in the steam-gun dissolves the silex, and dissolves or softens the resinous and other cementing matters which hold the fibres together and fasten them to the infiltration and intercellular and incrusting matters; and yet we are told by plaintiffs' witness, Dr. Rand, that the disintegrating process by the solvent and explosive power of steam is only like the *cutting of wood into chips* by a machine—that there is only a mechanical effect. He entirely overlooks the fact that the silex is *dissolved* and the resinous and other cementing matters are rendered *soluble in water* and consequently that much of the useless matter can be eliminated from the cellulose by a simple boiling of the disintegrated material in an open tub, followed by washing, or that it can be eliminated by the mechanical action of an ordinary rag engine, by which the disintegrated material is beaten in water into pulp and washed at the same time.

We cannot get rid of the resin, silex and coloring matter by merely cutting up wood into chips, and then treating them in an open tub or rag engine, in the way just mentioned. The fact is that an important chemical effect is produced by the action of the great heat due to 180 lbs. pressure, and by the action of the atmosphere upon the material when it is exploded into the air. The resinous matters are made soluble as they would be by the action of caustic alkali with heat.

When vegetable or animal substances are heated to a high temperature, all access of atmospheric air being excluded, numerous compounds are formed. Thus tar is extracted from the fir by the application of heat. The heat as applied to the bamboo in the steam-gun, extracts a strong acid from the wood, which is drawn off from the gun before the explosion takes place.

We have

1. A chemical process with the steam-gun.

2. Another chemical process by boiling in open tub with weak alkaline solution.
Or in lieu thereof a mechanical process of beating and working.

3. Another chemical process with alkali and a close boiler.

4. A further disintegration by chemical means, viz., by the chlorine.

5. Bleaching in the usual way.

The principal part of the disintegration of the fibrous material is effected by the preliminary process and only a small part of it by the intermediate process, the boiling with the caustic alkali in the close boiler.

See Points 10, 21 to 27.

Point 26.

PATENT CONFINED TO CHEMICAL TREATMENT SPECIFIED.

The patent is confined, as to the alkaline solution to be used, to a solution of "*pure* caustic soda" of the strength of 2° to 3° Beaumé.

Mere proof of the use of a solution of caustic alkali weaker than $3\frac{1}{2}$° B., or not shown to be *pure* caustic alkali, is legally insufficient.

I.

The Patent is confined to the Specific Solution called for.

In the case of Buchanan *vs.* Palser, Judge Hall held that the second claim of the patent "includes only the specified "boiling of the material treated *in the solution* and under the "conditions specified" (Record, fol. 50).

Judge Hall observed that the defendants in that case, although they used a solution of $3\frac{1}{2}$° to $3\frac{3}{4}$° Beaume, reduced it by the condensation of steam to 3°, "thus making the quan-"tity of strength substantially that required by the Mellier "process" (fol. 58).

And referring to Spofford's boiler patent, the Judge says that the specification did not call for the use of "caustic soda "of any particular degree of strength" (fol. 54).

See Rand's 2d examination, ques. 55, fol. 366.

He says that Mellier's claim "calls for a caustic alkaline so-"lution, *definite in quantity*." He is here trying to distinguish Mellier's patent from other patents.

Judge Benedict holds that the patent includes any solution *weaker* than $3\frac{1}{2}$° B.

It does not appear whether he holds that the use of such weak solution for the manufacture of pulp fit only for brown paper, and not bleachable, is an infringement. He says nothing on that question.

II.

The Patent is confined to the use of a Solution of Pure Caustic Soda in combination, &c.

(See Point 14. Also Point 27).

We need go no further back than to the patents of Coupier and Mellier, the French and American patents, in order to prove that the Mellier Patent must be confined to the combination of the specified temperature with the specified alkaline solution.

For the Coupier and Mellier patents taken together are:

1. For making pulp for white paper from straw.
2. The use of a solution of pure caustic alkali, without any admixture with lime.
3. For boiling under pressure.

So that nothing is left open for the Mellier patent, but the combination of a higher temperature than that called for by the Coupier and Mellier French patent, with the use of a weak alkaline solution instead of a strong one.

And then we have the fact that when the weak alkaline solution is used the liquor is thrown away, whereas, when the strong alkaline solution is used, it pays to evaporate and incinerate it. (fol. 658.)

When the strong alkali is used, the high pressure called for by the Mellier patent may be dispensed with, and a long boiling at a moderate temperature substituted for a short boiling at a higher temperature.

Much depends upon the mode of bleaching, which follows the pulping process.

See as to the manufacture of white straw paper in the United States, under Coupier & Mellier's patent, page 26 of this brief.

The plaintiffs' counsel, Mr. Jenckes, in his argument in the Philadelphia case, said (Argument, p. 134):

"We do not claim that if any one boils the material in alkali under pressure, and produces a coarse brown paper, it is an infringement of our patent."

Suppose a party to boil pine wood for ten or twelve hours in the chemical solution described in the patent, 2° to 3° B.,

at 70 pounds, producing a material which could not be made into paper pulp without further treatment, nor bleached in the way pointed out by the patent, it would not be pretended that he infringed the patent.

How could it be contended in such a case that the material required and received the same treatment as straw for the purpose designated in Mellier's patent, when the process and the product are entirely different from what is specified in that patent.

Pure Caustic Soda not used by Defendants.

There is no proof in this case that the alkaline solution used by defendants is a solution of "pure caustic soda."

The specification does not explain what is meant by "pure caustic soda." The *claim* merely mentions it thus, "pure caustic soda Na. O."

That chemical symbol merely means soda (Natron) which is a combination of Sodium (Natrium and Oxygen) (Na. O.)

The Court cannot judicially assume that "pure caustic soda Na. O." is what the witness Townsend speaks of as "the ordinary foreign crystal," "the ordinary crystal of commerce," "what is known in the trade as commercial caustic soda," (fol. 269, q. 47 and 48); nor that the solution prepared as described by the witness (fol. 264, q. 12, and fol. 270, q. 59) is a solution of "*pure* caustic soda."

We understand the fact to be that in order to make a solution of *pure* caustic soda, it is usually necessary to boil the foreign crystal with lime, in order to remove the carbon remaining in it, and to make the soda more caustic.

When white paper of superior color is to be made, care must be taken to get the proper proportions of lime and soda-ash, so as to leave no carbon.

Plaintiffs' counsel purposely avoided taking testimony on this point, as they insist that the use of *any kind* of caustic alkali is a violation of the patent. It is a very common practice for paper-makers to make caustic alkali, by mixing soda

ash with lime, and sometimes that is done so as to leave an excess of lime. See as to the use of lime by the defendants (fol. 137).

Burgess understood that defendants used in the preliminary boiling equal parts of lime and soda ash (fol. 155, q. 8). That was incorrect (fol. 284, q. 168). Whether there was or was not an excess of lime in the solution used by the defendants does not appear.

See remarks of Judge Hall on the difference between *pure* caustic alkali and such as contained lime (fol. 54).

Under Mellier's patent there is no new manufacture, no new art, no new product, and the only advantage claimed or mentioned is a saving in the quantity of alkali to be used—against which there is the running to waste of the spent liquor—on the whole a mere piece of doubtful economy.

From this we deduce two conclusions, heretofore stated, viz.:

First.—That the combination claimed was not patentable.

Second.—That if patentable, it is confined strictly to the particulars specified.

Point 27.

POINT OF FACT—ALKALI USED BY DEFENDANTS.

1. *On Straw.*—The pulp made by the defendants from straw was only fit for brown paper, and was accordingly made into brown paper.

   And there is no proof showing what was the strength of the solution of caustic alkali used by the defendants in making that pulp, nor whether the caustic soda was pure.

   The patent is confined to a solution of pure caustic soda.

2. *On Bamboo.*—There is no proof that the defendants, in making bamboo pulp for white paper, used an alkaline solution of the kind, strength and quality prescribed by the patent.

The answer denies the use of the specified solution (Record, fol. 95).

The defendants had a factory at Red Hook, Brooklyn, in New York, in which they made pulp, and a paper mill at Stockport, New York, where they made paper.

Straw.

They made some (very little) paper from straw disintegrated by Lyman's steam-gun, then boiled in waste or spent alkali solution in an open tank, then boiled in a close boiler in a weak caustic alkaline solution under pressure of from 40 to 60 lbs. (fol. 263).

All the paper made from straw was *brown* paper (fol. 316, fol. 279, q. 130).

No pulp fit for white paper was made from straw, except a *sample* made experimentally in a small model boiler, by a process as to which there is no evidence at all, which pulp was mixed with other materials (fol. 316, 317).

A small quantity of straw mixed with flax or hemp was made

into white paper by way of experiment; none was sold. Plaintiffs' witness, Donaldson, produces a sample and says (in reply to a leading question), that Fisher, an employé at defendants' works, told him it was made there by defendants by boiling the materials in a solution of caustic alkali under pressure, as practised by defendants (*Donaldson, fol* 149, *q.* 2 *to* 5), but there is no evidence showing how the defendants made that sample, *i. e.*, what pressure was used, etc.

Donaldson's testimony was objected to as hearsay.

Bamboo.

The defendants also made pulp for white as well as for brown paper, from *bamboo*, at the factory at Red Hook, and that pulp was made into paper at the company's mill at Stockport (fols. 263, 266).

The plaintiffs called McCracken and Townsend, employés at the works of defendants at Red Hook, Brooklyn, as witnesses to prove the steam pressure used in the boiling, and the strength of the alkaline solution used by the defendants.

No white paper was made at Red Hook whilst Townsend was employed there (fol. 279, q. 130).

The plaintiffs sought to prove that defendants used a solution of 8° B., so as to bring the use of the bamboo within what they supposed to be the limits of the Watt and Burgess patents.

But McCracken could only speak of the quantity of alkali used to a pound of bamboo;—of a weak alkaline solution being used, and added that he spoke only from recollection, and might be mistaken (fol. 138, q. 5).

He says the operations were experimental only, and that he worked under written orders specifying all the details (fol. 144, q. 43).

Plaintiffs did not think fit to call the president of the company who gave those orders. Plaintiff's counsel chose to leave the case without proof of the strength of the solution used by the defendants.

Townsend gives the quantity of alkali used to make a

pound of bamboo pulp, but does not prove the strength of the solution. This is the testimony (Townsend's) which Judge Benedict refers to as showing that the strength of the solution used by the defendants was *less* than $3\frac{1}{2}^{\circ}$ B. (fol. 264, q. 12).

Brown Paper.

Judge Benedict does not advert to the fact that the *straw* pulp which Townsend speaks of was made only for *brown* paper. In the argument of the Heft case, plaintiffs' counsel said (Printed Argt., p. 134): "We do not claim that if any one "boils the material in alkali under pressure, and produces a "coarse brown paper, it is an infringement of our patent."

Of course it is not. The alleged invention consists in the described process for making paper pulp which can be easily bleached.

There is no proof that the brown paper pulp made by the defendants was of that character. The presumption is that if it had been so it would have been made into white paper.

See the specification "the fibres may then be bleached by "the use of a comparatively small quantity of bleaching pow- "der or chloride of lime" (fol. 63).

Judge Benedict on the Alkaline Solution.

Judge Benedict says: "The respondents must be con- "sidered within the Mellier patent, which designated for straw "a strength of from 2° to 3° B. The testimony of the res- "pondents' witness, as explained by the respondents, gives a "strength *of less* than $3\frac{1}{2}^{\circ}$ B., and used by them, which would "bring them fairly within the scope of the patent in question."

The testimony does not show the strength of the solution at all. Judge Benedict does not say how *much less* than $3\frac{1}{2}^{\circ}$ B. was the strength of the alkaline solution which he considers the testimony shows to have been used—for aught that appears, it may not have been of the strength of 1 degree.

The defendants, in making *brown* paper from the steam-blown *straw*, may not have used a caustic alkaline solution exceeding 1° B. in strength, whilst in making paper pulp for *white* paper from *bamboo* they may have used a solution much stronger, probably 6° to 7° B.

Bamboo requires a great deal more alkali than straw when it is to be reduced to pulp for white paper, and for such purpose it would be perfectly futile to boil it at 70 lbs. pressure with a weak solution of caustic alkali like that which suffices for straw.

See the testimony as to the difference between the treatment of straw and wood.

Testimony as to the Solution used by Defendants.

Plaintiffs' counsel contended that the caustic alkaline solution used by defendants was 6° to 8° Beaume, *i. e.* 9 to 12 Twaddel. That was to bring the case within the Watt and Burgess patents.

Mr. Burgess understood it to be 8° Beaumé (fol. 155, q. 8, 9). But he misunderstood Mr. Townsend (fol. 284, q. 168).

The strength of the solution used either for white or brown paper is not proved.

Townsend speaks of using 5,000° to 3,000 pounds of the dry stuff, but that does not show the strength of the solution (fol. 264, q. 12).

As to McCracken's testimony for the plaintiffs, in relation to the strength of the caustic alkaline solution used by the defendants, it is admitted by plaintiffs' counsel that it is too vague to be of any legal importance.

McCracken speaks about the solution in which the boiling was done being $2\frac{1}{2}$° to 3° B, "per pound of bamboo." That would only give the quantity of alkali used, not the strength of the solution (fol. 138, q. 5 to 9, and fol. 144, q. 42 to 44). He says he speaks "only from recollection, and *may be mistaken*" (fol. 144, q. 42).

Consequently his testimony is not sufficient to show either the use of the *weak* alkaline solution called for by the Mellier patent for the treatment of straw, or of the *strong* alkaline solution called for by the Watt and Burgess patent.

It is proved, by Mr. Townsend, that the defendants put into the close boiler in which they boiled the material (previously

prepared) a solution of caustic alkali. One pound of the foreign crystal put into a gallon of water would average 12° Beaumé (fol 264, q. 12). One pound of soda ash, made caustic with lime, averaged 8° B (fol. 267, q. 34). One degree Beaumé is about equal to 1½ degrees Twaddell (see Table, fol 390).

They put 5,000° into the boiler, which would represent 416 lbs. of the crystal and 416 gallons of the solution at 12° B., or 608 lbs. of soda ash and 608 gallons of a solution of 8° B (fols. 264, 267, 269, 270, 284, 287 qs. 12, 34, 48, 53, 60, 61, 62, 168, 185). The crystal was dissolved in a separate vessel before being put into the pulping boiler (fol. 269, q. 49). *To this solution they added from* 1,000 *to* 1,200 *gallons of spent alkali liquor* (fol. 284, q. 168; fol. 287, q. 185).

What then was the *strength of the alkaline solution* in which the defendants boiled the stuff?

That cannot be computed, because there is nothing to show what was the strength of the spent liquor.

Besides, as the pulp which was taken from the tubs or beating engines and put into the boiler was *full of water*, the solution in which the stuff was boiled was even still further diluted to an extent not shown.

Townsend speaks of the pulp as it came wet from the beating engines (fols. 264, 265, 267, qs. 12, 19, 36). A calculation was made of how much of the stuff in a wet state as it was put into the pulping boiler would weigh if dry. This is what Townsend speaks of when he says they put 5,000° to 3,000 lbs. of the *dry* stock as it came from the beating engines (fol. 264, q. 12). Of course it was wet when it came from the beating engines. and an estimate was made of the quantity of dry fibre in the wet pulp.

Effect of a weak Alkaline Solution.

A weak alkaline solution suffices to *soften* the fibres of the steam-blown and cleansed cane, bamboo, &c., and enables them to be felted or matted together. This is a chemical action very different from what is required by the plaintiffs' process.

It is necessary for the plaintiffs, in treating crude wood, to remove the intercellular tissue, incrusting the fibre, by the use of strong, sharp, caustic alkali, and great heat. The alka-

line solution used for that purpose must be much stronger than that called for by the Mellier patent (fol. 375, q. 17). But as the defendants, by their steam-blowing and subsequent preparatory processes, get rid of most of the intercellular tissue and make the residue easily acted upon, before applying any caustic alkali, all that they need is a *softening* of the fibres to make them felt together. Hence they use the spent alkaline liquor over again, although it has no *causticity*.

If the patentee wanted to include the use of weak alkaline solution used in *large quantities*, he should have so stated. If the use of very weak alkaline solutions in large quantities were within the scope of the actual invention, the remedy would be a reissue of the patent. The truth, however, is that a very weak alkaline solution would not produce the desired effect.

The Court cannot judicially assume (what would be in fact a very erroneous assumption) that a great quantity of a weak solution of caustic alkali will produce the same effect as a smaller quantity of a strong solution of the same chemical. And even if the Court were to make such a gratuitous and erroneous assumption, it would not improve the plaintiffs' case, seeing that the patent does not propound such an alleged discovery or invention.

The wood chips, or bamboo, might be put into a very large quantity of a caustic alkaline solution of a strength of 1° (Twaddell), and notwithstanding the large *quantity* of the solution, would come out without being disintegrated.

In the present case there is no proof that the caustic alkali used was such as the Mellier patent required.

If it be considered that the patent is narrower than the real invention, the claim being clearly confined to the specified solution 2° to 3° B., the true remedy is to be found in a reissue, not in a loose construction to expand the patent beyond the claim actually made by it.

See *Curtis* on *Patents*, *sec.* 117 *and note*, to the effect that when things are described in the specification but "not represented to be part of the invention or discovery, which the patentee intends to cover," they are "dedicated to the public, even if they are original." But "this presumption may be removed by a surrender and reissue."

Supreme Court of the United States.

The American Wood Paper Company, Appellant,
vs.
The Fibre Disintegrating Company. } No. 58.

The Fibre Disintegrating Company
vs.
The American Wood Paper Company. } No. 151.

REPLY

ON BEHALF OF THE FIBRE DISINTEGRATING COMPANY.

R. W. RUSSELL,
Of Counsel.

M'GILL & WITHEROW, PRINTERS, WASHINGTON, D. C.

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REPLY

TO THE ARGUMENT ON BEHALF OF THE COMPLAINANTS.

I. THE REISSUES—NOT FOR THE SAME INVENTION.

Plaintiffs' counsel is incorrect in his statements as to the decisions in the courts below on this point.

Plaintiffs' counsel says, (p. 5:) "The Watt & Burgess patents are declared void for want of novelty." They are also declared void for another reason, viz: that they are "for a process substantially different from any described in the original patent." (See Opinion of Judge Benedict in our Abstract of Pleadings, &c., p. 40.)

On page 9 plaintiffs' counsel says: "Mr. Justice Grier gave no reasons for the conclusion to which he had arrived upon the Watt & Burgess patents. He might have concurred with Judge Cadwallader, or he might have sustained the point taken by the defense as to the want of identity in the inventions described in the specifications of the original and reissued patents." And he adds, that Judge Benedict followed the decision of the court in Pennsylvania, thus intimating that neither Judge Benedict, nor Judge Grier, nor Judge Cadwallader sustained that point.

In the first passage of Judge Grier's opinion he says: "That the reissued patents of 1863 are illegal and void, requires no further reasons than those alleged in the answer and clearly substantiated by the evidence."

The answer averred that they were not for the invention originally patented. And the *uncontradicted* testimony of experts substantiated that defense. And in the course of the argument of the Heft case in Philadelphia, Judge Grier intimated his opinion to be that the reissued patents were invalid for that reason. And Judge Cadwallader says, in the passage quoted by plaintiffs' counsel in his brief, (p. 80:) "The patentees did not intend to describe or to claim any process completed at one operation in which boiling under pressure was indispensable."

That being the essence of the alleged invention, it could not be imported into a reissue, and called the same invention as that originally patented.

All the experts who have been examined on the point, viz: Henry B. Renwick, Edward S. Renwick, and Professor Rogers, agree as to the essential difference between the reissues and the original patent; and all the three judges—Grier, Cadwallader, and Benedict—hold the same opinion. Plaintiffs' counsel did not choose to examine his experts, Drs. Rand and Cresson, on this point. Judge Cadwallader, it is true, holds that the question is what was invented, not what was patented. As to that point, see the full analysis of the cases in our brief. (*Point* 4.)

The reissued patents are for an invention which the patentees not only did not claim, but which they disclaimed. And it is the assignees of the patentees who say that they invented what they say they did not invent. Is not that unreasonable?

Plaintiffs' counsel (p. 81) repeats his favorite argument: "If Watt & Burgess antedated their invention in this case, it is for the public advantage, not their own." (See our Brief, p. 58, on this proposition.)

Watt & Burgess had strong reasons for antedating their alleged invention, as may be inferred from the history of the art, even as given by plaintiffs' counsel.

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whether the reissued patent is for the same invention as that originally patented, but that the inquiry is to be confined to the question whether the reissued patent is for the same invention as that for which a prior reissue had been obtained. And for this he cites The Providence Rubber Company *v.* Goodyear's Exrs., (11 Wall.,) on the mere strength of the fact, that in that case the court treated the question at issue as depending upon a comparison of "the context of the specifications of the surrendered and of the reissued patent."

The court state that the appellants contended that the patents in question were invalid, "because they are broader than the claims of the patent surrendered by the executor." That explains why the surrendered patent was compared with the reissued patent.

We submit that the proposition of the plaintiffs' counsel is untenable.

And further, that the case cited does not support the argument of plaintiffs' counsel on another point. On the contrary, it supports our proposition, that the validity of the reissue is open for examination.

And as to this and all the other India-rubber cases, it is to be observed that they differ essentially from the case in hand. Goodyear made a great chemical discovery, which he failed to properly describe and claim at first. Watt & Burgess took out a patent for an entirely worthless chemical process, for which they afterwards substituted another process.

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Brett & Little, 20 L. J. R., (N. S.,) C. P., 123, 151; 15 Jur., 5, 9.

In that case it was held, that the patent was not for a combination, but was for the special devices described in the patent, one of which was new; and therefore the verdict in favor of the plaintiffs was sustained.

The case has no application to the present one.

The patents now before this court are patents for processes, not for the elements of those processes. Thus, the Mellier patent is for a process for reducing straw to bleachable pulp, by boiling it in a solution of pure caustic alkali, of a specified strength, under a steam pressure not less than that specified.

It is not for the alleged discovery that a steam pressure of 70 pounds to the inch should be used in boiling all vegetable fibrous substances in solutions of caustic alkali of any strength and any quality; and if such a patent had been obtained, it would have been void for the reasons fully presented in our brief. (*Point* 13.)

The Mellier patent is for a process, and Judge Hall correctly held, that to constitute an infringement, that process must be used—including the high pressure, "not less than" 70 pounds—pure caustic alkali—and that of the strength of 2° to 3° B. for straw.

If Mellier invented or discovered any or either of the elements of the process, a reissue of the patent could be obtained, so as to claim them in addition to the process.

So if he was the first inventor of the single-stage chemical process, as Judge Cadwallader assumed him to be, that invention might be properly described and embraced in a reissue. It would not affect the defendants in this case.

The case of *Mowry* v. *Whitney*, 14 *Wall.*, 629, cited by plaintiffs' counsel, does not sustain the proposition for which it is quoted, but does sustain our proposition.

It was there held,

"When a patent is for an entire process, made up of several constituent steps or stages, the patentee not pretending to be the inventor of those con-

stituents, his claim to the *process as an entirety* does not secure him the use of the constituents singly. What is secured is their use when arranged in the process."

III. Alleged peculiar Character of the Fibre made by direct Chemical Action alone.

Plaintiffs' counsel says (p. 8) that—

"The cellulose thus obtained from the *wood* is perfectly pure; and, what is most remarkable, and in *which the novelty of the invention consists*, this substance is of the exact consistency, length, and other dimensions required in a fibre for paper-making. Watt & Burgess were the first to discover this fact."

It is added that the fibre thus made by chemical agencies alone "could be wrought at once into paper."

No such discovery is announced in their patent.

The alleged discovery is diluted by what plaintiffs' counsel says, on page 24, viz: that what he calls "the ultimate fibre" of *straw*, as well as that of "*wood*," is "*often* the exact length required for pulp."

Plaintiffs' counsel says, page 8, that defendants have not proved that any of the processes referred to by them would produce "*pure* cellulose from wood."

Defendants have proved patents for making wood pulp by the application of caustic alkali and heat in conjunction with mechanical and other processes, and therefore claim the right to do the same. How good the pulp was is immaterial. Nor would proof of what was done under the foreign patents be admitted by plaintiffs' counsel. (See his objection, p. 16 of Brief.)

Plaintiffs' counsel says, page 8, that it was proved by complainants' witnesses, and not denied on the part of the defense, that the fibre produced by the process described in plaintiffs' patent is pure cellulose.

There is no such proof in the case. If, however, plaintiffs do make it by their process, the defendants cannot make it by theirs; which shows that there is a difference between the processes.

IV. Single-stage Chemical Process.

On page 9 plaintiffs' counsel quotes Judge Cadwallader's opinion, that pulp had been made by others from wood and straw, but that "in every such case the process had been one of successive stages." "The process had never been such as to produce the pulp at one operation."

The novelty of the processes of Watt & Burgess and of Mellier is made to rest on that fact.

But the defendants have preferred not to use that process: they prefer a process of successive stages, chemical and mechanical, with all the supposed disadvantages attributed to such a process by plaintiffs' counsel.

Again, on page 21, plaintiffs' counsel says:

"The object is the removal of *all* the intercellular tissue, leaving only the fibre which goes into the manufacture of paper. That result is obtained *entirely* by the action of these chemical agents. There are no *mechanical means used* for the purpose of *aiding* in the operation: all is done by the sole agency of chemicals."

The product plaintiffs' counsel calls "pure cellulose," (Brief, p. 20.) And on page 24 he says:

"In wood and straw the *ultimate fibre* of cellulose is *often* the exact length required for pulp, and it can be run into paper at once, when eliminated without any preparatory mechanical treatment." (p. 27.) "If cellulose should be produced in fibres of such *length*, and possessing such properties as those in *which it had previously been found and used in the manufacture of paper*, the experiments would have provided only a new variety of 'paper stock' for the manufacturer, which would have to be subjected to the *ordinary mechanical treatment* before paper could be made from it."

It is thus contended that the cellulose produced by the single chemical action has such properties and is in such condition, that it can be at once felted into paper.

Well, then, those who are content to produce fibres of such length, &c., as "had previously been found and used in the manufacture of paper," and which "have to be subjected to the ordinary mechanical treatment before paper could be made from it," should not be interfered with by the plaintiffs.

On page 49 plaintiffs' counsel again says:

"The cellulose derived from wood by the Watt & Burgess process is of the exact length and possesses the precise qualities which fit it to be converted into paper at once. It is soft, non-elastic, porous, and mats or felts properly in the paper-making machine, without any previous mechanical treatment."

That statement does not accord with the testimony in the record. Thus the plaintiffs' witness, Dr. Rand, says, (upon cross-examination by Mr. Geo. Harding:)

"The use of the rag engine is necessary after the pulp is bleached, before it can be made into paper." (fo. 386, q. 83.)

The rag engine is the beating engine, in which rags are beaten up into pulp.

Again, Dr. Rand, (fo. 373, q. 5,) states what is done with the material taken from the pulping boiler:

"The material, after washing, is taken to the beating engine—an ordinary rag-beating engine, as I understood, modified by having the points on the beating cylinder blunt instead of sharp. I don't know how long it was in the beating engine, but I was informed a short time."

He then describes the bleaching, (which is in the ordinary way,) and adds:

"The bleached pulp is now washed, and submitted to a *prolonged beating* in the rag engine. This prolonged beating is found to enable it to hold water, as it is termed, when passing over the wire of the paper-machine."

This disposes of the imaginary discovery of Watt & Burgess, of the pecular character of wood fibre obtained by a single-stage chemical process, as distinguished from fibre which had been commonly obtained by the joint application of caustic alkali and heat and mechanical means. That fibre, undoubtedly, was long, and required beating up before it could be made into paper.

There is no such thing as "the ultimate fibre" of wood and straw; it is indefinitely divisible. And as to "pure cellulose," it would be useless in paper making. If all the intercellular matter be removed, the *fibrous* character is destroyed. (E. S. Renwick, fo. 360, q. 24.)

Plaintiffs' counsel says, page 38, that the patent of Gros

"Relates to the production of a material out of which *paper pulp can be made by the well-known mechanical processes*, and not the production of pulp by *direct chemical action*."

Again, on page 39:

"There is no language in the specification of Gros which shows that he believed that he had eliminated a pulp of *pure* cellulose from the broom plant by *chemical agencies alone, at one operation*. He evidently considers his *mechanical treatment* of the raw material of as much importance as his chemical operation."

"The simplicity and directness of the Watt & Burgess process is wholly wanting."

Is it not, then, unreasonable to object to our making "a material out of which paper pulp can be made by the well-known mechanical processes?" We do not produce "pulp by direct chemical action."

V. Review of the History of the Art, as related by Plaintiffs' Counsel.

Plaintiff's counsel, on page 7 of his brief, cites Regnault's Chemistry, to show that it has long been known that the cellular tissue of all plants is *removed* from all the other component parts of the plant *by heat and caustic alkali*. It, therefore, is not pretended that Watt & Burgess or Mellier discovered that process.

Page 27 plaintiffs' counsel says:

"It was known that wood or straw could be easily saturated and softened by alkaline solutions, and *that heat would increase their effect*. But it was not known that the combined action of heat and alkali would *remove all the intercellular tissues*, and leave the fibre a *pure cellulose*, with the *precise form and qualities desired*."

We repeat, that we do not want to make any such product: we do not want to remove "all the intercellular tissues" by "heat and alkali." We are content to remove enough to make a fibre which can by subsequent treatment, either mechanical or chemical, or both, be made into paper of the desired quality. Moreover, we prefer to prepare the fibrous material by eliminating the principal part of the acid and other worthless matter before even applying the heat and alkali.

On page 28, plaintiffs' counsel says that all the previous inventions "are based upon the old and well-known mechanical processes, and *bring in chemical agencies as ancillary only:*" that the chemical agents were not applied "for dissolving or *entirely removing* the intercellular tissue, and that there was no useful result.

The assertion that the previous operations were "entirely barren of any useful result," is contradicted by what plaintiffs' counsel says in other parts of his argument, and by notations made by him, showing that merchantable paper was made—whether as white and as good as that now made by the free use of cheaper chemicals and the restoration of the spent alkali, is of no consequence. Perhaps, however, he considers no result of a chemical agent useful unless, unaided by any other chemical agent, or by mechanical means, it should entirely remove the intercellular tissue.

His review and analysis of the patents in evidence in this case is incorrect, as will be seen on comparing it with our review and analysis of the same patents, with explanatory notes and corrections of Dr. Rand's criticisms. See our brief, pp. 11 to 33, particularly as to the patents of Mongolfier, Wright, and Gros, which are entirely misrepresented in the analysis by plaintiffs' counsel in his brief, pp. 31 to 38, and also by Dr. Rand. The latter gentleman admits that he is a novice in the art in question—the manufacture of paper pulp. (Record, fo. 371, q. 1.)

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Plaintiffs' counsel says, page 39, the defendants only examined their experts upon one of those patents, viz: that of Gros. That patent required explanation: the others did not.

The defendants' experts were called to prove that Gros did "reach the minimum degree of heat prescribed by Watt & Burgess." They show it would reach 297° or

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298°. (H. B. Renwick, fo. 342, q. 4; E. S. Renwick, fo. 353, q. 13.) Dr. Rand agrees with them.

The Watt & Burgess patent says, "near or above 300°." Plaintiffs' witness, Burgess, says that 290° F. would be "about" 300° F., and within the meaning of his patent.

See a refutation of Dr. Rand's criticism on the Gros patent, especially as to his illusory experiment to test Gros's process. (Defendants' Points, p. 22, note.)

In the history of the proceedings under the Watt & Burgess patents, as given by the plaintiffs' counsel, it is stated, on page 52, that there was a "short stoppage in 1857" of their works. They made rag paper instead of wood paper. That was owing to the cheapness of rags at that time. The same cause had led to the stoppage of the straw-paper mills from time to time in England.

On page 54 plaintiffs' counsel says:

"In the paper mills constructed in 1853 there were no close boilers, capable of bearing 60 pounds' pressure." And he adds that the Spofford rotary boiler, patented in 1840, (as to which see our Brief, page 16,) was "capable of sustaining a pressure of only from 20 to 40 pounds."

That statement is proved to be erroneous by the testimony in this case, (fo. 256, qq. 7 to 13,) showing that 60 pounds' pressure by the gauge was commonly carried in 1852.

On page 95 plaintiffs' counsel gives what he calls "reasons for Mongolfier's failure," and he says "their experiment failed." We have no proof of that. Their principal object was to make cheap paper for pasteboard and other coarse articles; and plaintiffs' counsel confounds the directions given by the patent for the coarse manufactures with those given for the superior article, and misapplies the calculations, as we have shown in our brief, pages 14, 15, notes.

Most of the processes were better than that described in Watt & Burgess' original specification, and which in

practice was an utter failure, and was abandoned. The reissue system (which, as practiced here, is peculiar to our law) would, if applied to the patents of Wright, Gros, Mongolfier, &c., bring out new and amended descriptions of processes like that finally adopted by Watt & Burgess. In fact, the patents of Wright, &c., had a better foundation than Watt & Burgess' original patent had for such reissue.

Wright's Patent.

On page 95 plaintiffs' counsel refers again to Wright's patent, and says:

"He does not ~~maintain~~ mention any temperature above the boiling point."

This is an error, as will be seen on referring to the patent, (fo. 627,) where the invention is said to consist, amongst other things, in "the peculiar apparatus or machinery employed for the purpose of boiling the same (the straw) by *high*-pressure steam."

But plaintiffs' counsel says (p. 37) that the apparatus was not adapted to "high pressure" nor to any pressure, "as the head of one of his boilers, as described, would have to withstand a pressure of 125,000 pounds, at a pressure of one atmosphere."

That is a calculation made by Dr. Rand. See refutation of it in our Brief, pp. 19 to 21, note.

Wright proves that he commonly used 40 to 50 pounds' pressure.

But plaintiffs' counsel, after calling him as a witness and eliciting that fact from him, says, (p. 37:)

"No portion of the deposition of Wright is evidence in this case for any purpose."

Plaintiff's counsel also says, p. 36:

"There was but sixteen hundred weight of pulp used in all at this mill; not more than the usual product of two boilings. He then abandoned the business, and it was never resumed under his patent."

That is a mistake. He made under his patent straw paper in large quantities, by boiling the straw in close boilers under high-pressure steam. He made fifteen tons a

week, and the manufacture was continued for seven years. (fo. 410, q. 83.) He was better acquainted with high-pressure steam than any man in Europe, and he made high-pressure boilers for the Emperor of Russia, and for many munufacturers in France and England.

Lime—Use of Pure Caustic Soda.

But plaintiff's counsel insists that Wright's white straw paper was not of good quality, because lime was used in one of the stages of the pulping process, and that injured the color.

It will bear a favorable comparison in that respect with the wood paper made a few years ago by the plaintiffs.

Plaintiffs' counsel (p. 100) says, as to the avoidance of lime in pulping:

"Coupier & Mellier and *Watt & Burgess* were the first to discover this improvement contemporaneously in different countries."

No mention is made of such discovery by Watt & Burgess in their original English patent, nor in their American patent, nor even in the reissue of 1863.

The discovery in question is public property.

Coupier & Mellier's Patent.

Straw paper, for newspapers in Philadelphia and other places, was made with the boiling apparatus called for by Coupier & Mellier's patent and the use of caustic alkali free from lime.

Fo. 459:

"The Philadelphia Ledger and the New York Daily Times are printed on paper made in this manner."

The alkali, however, was used sparingly, as they had no apparatus for restoring it, such as the plaintiffs now have, and by means of which they are able to afford the use of very strong alkali for pulping wood and straw.

Quotations from Scientific Publications.

In the *Reports of the Juries of the International Exhibition of* 1862, as quoted by plaintiffs' counsel in his *brief*, pp. 104, 105, it is stated that the cost of chemicals, &c.—

"Prevented any large development of the straw-paper trade till about 1855, when three patentees, Sullivan, Mellier, and Jullien, almost *simultaneously invented improvements.*"

That Sullivan boiled in a *weak* solution of caustic ley, with superheated steam; and that Jullien used a rotary boiler, having a peculiar movement, to *alternate* the effects of the steam and the chemicals on the fibre.

It is also stated that Mellier substituted "a revolving boiler" for the upright boiler, and used 90 to 100 pounds' pressure. (His American patent speaks of 84 as the highest that could be beneficially used. (Fo. 37.) The availability of the higher temperature appears to have been discovered afterwards. A great point was the particular form of the boiler. That is covered by the *first* claim of his patent. For his process 90 to 100 pounds were found essential even for straw, and yet his American assignees object to our using 60 pounds for our process, compounded of several chemical and mechanical appliances to pulp wood.

It is further stated that Jullien used a rotary boiler, "and a peculiar movement to *alternate* the effects of the steam and the chemicals on the fibre."

And it is added:

"All three processes continue successfully at work, *some makers using one process, some another*, as best-suited to their several makers and localities."

It will be observed that no mention is made of Watt & Burgess, and that Sullivan used *superheated steam*. So here we have caustic alkali and great heat, without high pressure.

We have commented upon the scientific publications cited by plaintiffs' counsel in our "Abstract" of the evidence, statement of facts, &c., (pp. 50 to 61,) showing the

history of "the manufacture of straw paper at and prior to the date of the Mellier patent."

The "*Annual of Scientific Discovery*" for 1855, as quoted by plaintiff's counsel, states, in relation to the conversion of straw into white paper:

"The process, as ordinarily pursued, is a simple one, and not covered by any patent."

The writer of that article doubts whether the paper can be *profitably* made, because the reduction of the straw to bleachable pulp requires a great quantity of alkali, and it had not been demonstrated that the alkali remaining in the liquor in which the boiling had been done could be restored.

Restoration of Alkali.

That has since been successfully accomplished by the method prescribed in Coupier & Mellier's French, English, and American patents, (fos. 935, 643, 658,) all of which have expired. That method, however, was not new.

The successful restoration of the alkali at a moderate expense has settled the question about the profitableness of the manufacture of white straw paper, and has led to the use of low-pressure boiling with strong alkali, instead of high-pressure boiling, which injures and wastes the fibre, although it saves alkali. (See our Abstract, p. 60; also, 56.

It is to be observed that the extracts from scientific publications quoted by plaintiffs' counsel were not put in evidence.

Coupier & Mellier's Process.

In "*Waste Products and Undeveloped Substances*," by Simmonds, editor of "*The Technologist*," published in London, 1862, it is stated that Coupier & Mellier's process followed Wright's. The author speaks of the patent "granted to Samuel W. Wright, of Massachusetts."

"The process was mainly mechanical, and *good white paper* was the result. A great excitement was created by it, licenses were sold in Europe, and ma-

chinery was built in England and France, but after a short time it was abandoned as too expensive."

He adds that Wright's process was succeeded by the process patented by Coupier & Mellier in Europe and America, the leading features of which process were "a reverberatory furnace to *recover two thirds of the soda.*"

(This permitted the use of very strong alkali.)

"Apparatus to throw uniformly the solution over the straw."

These two points constituted the leading *novelty* of the invention.

A third novel feature, the use of *pure* caustic alkali, is not prescribed in the English patent. It first appears in the American patent, (fo. 654,) which has expired.

Nevertheless, the manufacture in England was, according to Simmonds, a successful one. It could not fail to be so, with the restoration of two thirds of the alkali, unless, indeed, rags should be very cheap, as in 1857, when the plaintiffs left off making wood paper for a time and worked up rags.

"Coupier & Mellier's process has now been in operation for several years in Ireland, England, and France: the prejudices against it are wearing away. *La Presse* of Paris, the London *Star*, and other journals, are now printed on straw paper. The Philadelphia *Ledger*, *The Dollar Newspaper*, the New York *Tribune*, and various other American journals of large circulation are printed on straw paper."

No mention is made of Mellier's patent for substituting great heat in the place of strong alkali. The date of this publication is 1862. Since the adoption of the alkali restoring process it has been the practice in England to use low-pressure steam—about 5 to 40 pounds.

VI. The Boiler Patents.

Plaintiffs' counsel (p. 111) quotes from Judge Benedict's opinion that Keen's patent of 1859 "is for a combination, of which the stirrers described are a material part. The

evidence shows, however, that the stirrers are not used by the defendants."

And plaintiffs' counsel argues that they had been used. That is not so. A *single* old-fashioned stirrer, such as had long been used for stirring other materials, not paper pulp, was used by the defendants: not "the patent stirrers"—double stirrers—of the peculiar construction described in Keen's patent, to prevent the stock falling upon the stirrers. (See the difference explained in our Brief, Points 11 and 12, p. 78.)

Besides it was conceded by plaintiffs' counsel, in his argument, that the stirrers were found to be useless, and, therefore, that if the plaintiffs wanted to stand upon the patent, they must reissue it. (See our Brief, p. 76.)

It was also proved that the plaintiffs did not use the double stirrers, deeming them usseless, and that the defendants found their single stirrer open to the objection which Keen sought to remove by his contrivance, and they abandoned it as useless. (See our Brief, p. 75.)

As to Keen's boiler patent of 1863, plaintiffs' counsel stands upon the 2d claim, for the mode of discharging the boiler by blowing out the contents under a head of steam, as an independent claim.

It is a claim of the described method, in combination with the patented boiler, and the reason for so claiming it is evident, from the fact that the same mode of discharging a pulping boiler is *described* in the Watt & Burgess reissued patent, (fo. 27,) which reissue was obtained 7 April, 1863, and Keen's boiler patent was issued 16 June, 1863, both for the benefit of the same parties.

And plaintiffs' counsel, (Brief, page 73,) explaining why, in the reissued patent, this mode of discharging the boiler was inserted for the first time, says:

"The next addition is of a direction of the best mode of removing the pulp from the boiler. *This is no part of the invention or of the claims.* It is merely *directory* as to the best mode of performing an operation incident to the use of the invention."

See our brief, pages 78 to 80, on this subject.

VII. As to the Mellier Patent.

Plaintiffs' counsel says, (p. 113,) the defendants' experts were not examined as to this patent. The reason appears in our *brief*, p. 34. The plaintiffs' experts confined the Mellier patent to straw, (Rand, fo. 383, q. 67,) and therefore the patent was considered to be of no importance to the defendants.

But a question being now raised on this patent, the defendants avail themselves of the testimony taken on the Watt & Burgess patent.

Plaintiffs' counsel says, (p. 119,) that Judge Woodruff adopted Judge Hall's construction of the Mellier patent. Not so. (See our Brief, p. 43.)

It is true that Judge Woodruff, in his opinion, said that he concurred with Judge Hall in his opinion that the Mellier patent did not define a minimum temperature to be used.

That is not Judge Hall's opinion. On the contrary, he said: "The phrase 'not less than' fixes a *minimum* limit, without regard to a *maximum*."

Judge Cadwallader's opinion is not in favor of the complainant in the present case. (See our Brief, p. 126.)

Judge Cadwallader holds, contrary to Judge Hall, that the construction of the patent should be, that it is without limits as to pressure, or the kind or degree of alkali used, or the materials treated, provided that the pulping is completely effected, so that bleachable pulp is produced by what the plaintiffs' counsel and the plaintiffs' experts call direct *chemical action alone in a single stage.*

If that proposition were a sound one, it would not affect the defendants in the present case. But on behalf of other manufacturers, we submit that the proposition is untenable, for the reasons presented in our brief.

Judge Benedict's opinion on the construction of the patent is not in accord with that of Judge Cadwallader, nor with that of Judge Grier, nor with that of Judge Hall.

VIII. As to the Objection to the Decree taken on p. 120.

The court did not undertake to determine the question of profits. The counsel for both parties agreed in open court that the decree should be in the form now complained of in respect to profits.

CONCLUSION.

As to the Watt & Burgess Reissued Patents.

1. They are void for the reasons presented in our Points, (1 to 9, pp. 47 to 73.)

2. There was no novelty in high-pressure boiling. The patents of Wright and Mongolfier called for high-pressure boiling without limit. (See Point 13, p. 82.)

The German publications show a common use of high-pressure boiling above 70 pounds. (See Points, pp. 85 to 88.)

3. The alleged novelty is claimed to consist in the use of a single-stage chemical process; that "no mechanical means are used for the purpose of aiding in the operation—all is done by the sole agency of chemicals" "at one operation." That "the simplicity and directness of the Watt & Burgess process is wholly wanting" in the process of Gros, Mongolfier, &c., who made wood pulp by boiling in caustic alkali under pressure, but who effected the disintegration partly by mechanical means.

The patents are so construed by the patentee himself, by *all* the experts, and by plaintiffs' counsel. (See our Points, 10 and 24, p. 74, 125.)

Therefore, those patents cannot have any application to a compound process consisting of several constituent steps or stages to effect the disintegration of the wood—such disintegration being effected.

(*a*) By the action of the steam gun, (which is a chemical and mechanical action. See Points, p. 132.)

(*b*) By an open tub, boiling with weak alkali, or by the mechanical action of the rag or beating engine.

(*c*) By washing out the interstitial matter liberated by the previous processes.

(*d*) By a boiling with impure caustic alkali, under a light pressure, which would be useless if applied to the same material which had not gone through the previous process.

(*e*) By completing the disintegration by the aid of the bleaching agent. (See Point 25, p. 131, and testimony of Rand, fo. 382, qs. 61, 62; Burgess, fo. 229, q. 125.)

By which series of processes a material is produced which plaintiffs' counsel says is quite different from theirs. And yet he contends that the patent for their product prevents us from making ours!

As to the Boiler Patents.

The decision that the defendants did not infringe either of them is plainly correct, and in accordance with the testimony of the *mechanical* experts.

As to the Mellier Patent.

1. The patent is for a process embracing (1) the use of steam pressure not less than 70 pounds; (2) the use of pure caustic alkali; (3) a strength of alkali solution 2° to 3° B. (See Points 20, 21, 22, 26, pp. 109, 111, 116, 134.)

2. The defendants not only did not use this process; they did not use any one of the elements.

(*a*) They used less than 70 pounds' pressure. (See Point 19, p. 101.)

(*b*) They did not use pure caustic alkali. (See Point 27, p. 138.)

(*c*) They did not use an alkaline solution of the prescribed strength. (See Point 27, p. 138.)

3. The patent is for the process as an entirety, and not for any or either of the constituent steps or stages. There was no novelty in either of the elements forming the process.

(*a*) There was no novelty in high-pressure boiling. The patents of Wright and Mongolfier called for high-pressure boiling with caustic alkali without limit. (See Point 13, p. 82.)

The German publications show a common use of high-pressure boiling above 70 pounds. (See Points, p. 85 to 88.)

The Watt & Burgess patents call for pressure boiling above that limit. (See Point 13, p. 82.)

(*b*) There was no novelty in the use of a solution of pure caustic alkali. That is called for in Coupier & Mellier's expired patent. (See Point 14, p. 94.)

(*c*) The only novelty was in the limitation of the strength of the alakine solution, which was prescribed upon the theory that with 70 pounds' pressure that strength of alkali would suffice to convert the acid of the straw into soluble soap; which theory is not proved to be well-founded. (See Point 15, p. 97.)

4. The Mellier patent is claimed to be like the Watt & Burgess patents, for a single-stage chemical process. And upon that ground it is sought to distinguish it from the prior inventions and old processes. (See *supra* and Point 24, p. 125.)

As before observed, in relation to the Watt & Burgess patents, the defendants do not use a single-stage chemical process, but a compound process,—(see Point 25, p. 131,)—a process for disintegration consisting of a greater variety of operations, prior and subsequent to the boiling with caustic alkali, than the operations under the old processes. And the intermediate boiling with caustic alkali, applied to the bamboo, &c., would be of *no use* whatever without the preliminary and subsequent chemical and mechanical processes. (See Points, p. 119.)

Judge Benedict, in holding that there is no minimum limit to the pressure, and no limits to the strength of the alkaline solution, is opposed to Judge Hall. And in following Judge Hall's decision that Mellier was the inventor of high-pressure boiling, he overlooks the testimony in this case which was not before Judge Hall.

Judge Benedict, moreover, differs from Judge Cadwallader's opinion as to the real foundation of the patent. (See Points, pp. 126 to 130.) And differs from Judge Grier on the question as to what materials the patent applies to and as to the meaning of the words 70 pounds' pressure.

Judge Benedict holds, that bamboo (which is wood) (Rand, p. 174, q. 18) is grass.

In the other cases there were no questions similar to those raised in the present case, in relation to *compound* processes applied to wood.

We submit, that the decree, so far as it is in favor of the defendants, should be affirmed, and that so far as it is adverse to them it should be reversed with costs.

Supreme Court of the United States.

No. ~~253.~~ 58

THE AMERICAN WOOD PAPER COMPANY,

Appellant,

vs.

THE FIBRE DISINTEGRATING COMPANY.

No. ~~362.~~ 157

THE FIBRE DISINTEGRATING COMPANY,

Appellant,

vs.

THE AMERICAN WOOD PAPER COMPANY.

Appeals from the Circuit Court of the United States for the Eastern District of New York.

ABSTRACT

Of Pleadings, Evidence and Decree. Statement of Facts; Opinion of the Court; Statement of Errors.

R. W. RUSSELL,

Of Counsel, FOR THE FIBRE DISINTEGRATING COMPANY

NEW YORK:

EVENING POST STEAM PRESSES, 41 NASSAU STREET, CORNER LIBERTY.

1873.

Supreme Court of the United States.

No. 259.

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Appellant,

vs.

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" M. 6. The same as L picked open.

" D. Sample bamboo paper made by defendants' process.
The *N. Y. Tribune*, referred to in Burgess' testimony, fol. 243, q. 174, and in Howland's, fol. 257, q. 17 to 20.

" R. Letter from the Committee of the Privy Council (England), to L. Wright, requesting him to exhibit his straw paper in Paris (referred to in Wright's testimony, fol. 293., q. 9-10).

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Supreme Court of the United States.

No. 259.

THE AMERICAN WOOD PAPER COMPANY,
Appellant,
vs.
THE FIBRE DISINTEGRATING COMPANY.

Abstract of the Pleadings and Proofs.

Abstract of the Bill on the Watt & Burgess Reissued Patents, and Keen's Boiler Patents.

Record, fol. 2—The bill states that a patent was granted to Watt & Burgess, dated 18th July, 1854, for fourteen years, from 19th August, 1853 (date of an English patent), for an improvement in the manufacture of paper from *wood*.

Fol. 4—That on the 5th October, 1858, upon a reissue, a new patent was granted to Ladd & Keen, assignees of the original patent.

Fol. 4—That on the 7th April, 1863, the last-mentioned patent was surrendered, and two patents were issued in lieu thereof to Ladd & Keen—one for a process, the other for a product.

Fol. 5—That complainants are the assignees of those patents.

Fols. 21 to 29—Sets forth those reissued patents, *Exhibit A*, fol. 21, and *Exhibit B*, fol. 25.

The Boiler Patents.

Fol. 11—States that, 13th September, 1859, a patent for an improvement in boilers for making paper pulp was granted to Keen.

Fol. 73—Sets out that patent, *Exhibit L.*

Fol. 12—That plaintiffs are assignees of the patent.

Fol. 13—That on the 16th June, 1863, another patent was granted to said Keen for an improved boiler for making paper pulp.

Fol. 12—That plaintiffs are the assignees of that patent.

Fol. 15—That defendants have infringed the said patents.

Fol. 78—Sets out the patent of 1863, *Exhibit N.*

Abstract of the Answer as to the Watt & Burgess Patents, and as to Keen's Boiler Patents.

Fol. 87—As to the Watt & Burgess patents, avers that the reissue of 1858 was void.

Fols. 88, 89—And that the reissues of 1863 were void.

That the reissues were not made for the purpose of having a *defective* specification corrected, nor for the purpose of *separating* inventions described in the patent.

Fols. 109 to 113—And avers that the reissued patents are not *for the same* invention for which the original patent was issued.

Fols. 87, 90, 114, 115—Avers that Watt & Burgess were not the first inventors of the alleged invention, but the same was previously known and used by others, and described by others, as afterwards particularly mentioned.

Fols. 91, 92—Denies the novelty of the inventions claimed by Keen's patents. The inventions were formerly known and described, as afterwards mentioned and referred to in this answer.

Fols. 96 to 108—Refers to prior patents and publications affecting the validity of all the patents sued on. Also names parties in the United States who used high steam-pressure with caustic alkali for pulping.

Fol. 115—That Ladd & Keen, in applying for the reissues of

1863, claimed, as the invention of Watt & Burgess, "the production of paper pulp by the *sole action of alkaline solutions under a given pressure.*"

Fols. 116 to 118—States that defendants did not produce paper pulp by that process. Sets forth the defendants' process. Denies the alleged infringements.

Amended Answer.

Fol. 121—That the Watt & Burgess patent of 1854 is void for concealment and insufficiency of the specification.

Fol. 122—Refers to Wright's American patent and to certain German publications.

Fol. 125—*Replication.*

Abstract of the Watt & Burgess Patents.

The original patent of 6th January, 1854 (fol. 578), is ante-dated to 19th August, 1853, the date of an English patent (fol. 908), alleged to be for the same invention, but which is, in truth, for a different invention; wherefore the defendants contend that the patent of 1854 is void.

This patent of 1854 was expanded in a reissue dated 5th October, 1858 (fol. 376).

The latter patent was surrendered and two patents reissued in its place, dated 7th April, 1863 (fols. 20 to 30). One of these reissued patents is for a process, the other is for the product of that process.

The first claim of the process patent (fol. 28) is for a process of treating vegetable substances by boiling them in a solution of caustic alkali under pressure at near or above 300° F., for making paper pulp.

The second claim (fol. 29) is for a process of treating resinous woods to make white pulp, by boiling the wood in a solution of caustic alkali under pressure, and treating the product with chlorine after washing out the alkali.

"The mass must then be again well washed and treated with a weak solution of caustic alkali."

The Questions presented on the Watt & Burgess Patents.

The questions presented by the pleadings and testimony relate to the alleged novelty of the high-pressure boiling with a solution of caustic alkali, the difference between the original patent of 1854 and the English patents to which it refers—the differences between the original patent and the reissued patents of 1863—the excess of jurisdiction by the commissioner of patents in the granting of those reissues, the defectiveness of the specifications, and concealments of the principal features of the alleged invention, and the difference between the single-stage process of the plaintiffs and the compound process of the defendants.

All of the experts examined on the question agree that the reissued patents of 1863 are not for the same invention as that patented by the original patent of 1854.

See these matters set forth in detail in the *Points* on behalf of the defendants.

Abstract of Keen's Boiler Patent, Sept. 13, 1859 (*fol.* 74).

The invention is stated in the patent to relate to a boiler for boiling wood and ligneous materials for making paper pulp, "constructed with an expansion-chamber, stirrers and discharge-valve or cock," arranged substantially as described (fol. 75).

The boiler is charged through an aperture in the expansion-chamber (fol. 74).

The stirrers are so constructed as not to be "in the way of the material as it is thrown into the boiler" (fol. 75).

The discharge-cock is opened by means of a hand-wheel (fol. 75).

The Facts as to the 1st Boiler Patent.

The evidence shows that the defendants did not use any of these peculiar contrivances, and that there was no novelty in the ordinary expansion-chamber and discharge-valve used by defendants, and that the stirring apparatus used by defendants was different from that of

plaintiffs, that there was no novelty in stirring apparatus generally, and that the stirring apparatus used by plaintiffs and defendants was entirely useless and was accordingly abandoned by both parties.

Abstract of Keen's Boiler Patent of 16 *June*, 1863 (fol. 78).

The invention is stated to be for the purpose of avoiding a difficulty which had theretofore existed in boilers where a perforated diaphragm is placed in the interior, and through which the material to be pulped is passed (fol. 79). The "invention consists in connecting the man or feed-hole through the diaphragm by a perforated wall or cylinder" (fol. 79.) The specification also describes a discharge-pipe at the bottom of the boiler, and a stop or discharge-valve for blowing out the contents of the boiler, whilst under pressure, when said contents have been sufficiently boiled (fol. 80).

The 1st claim is for a boiler with that contrivance (fol. 80).

The 2d claim is "in *combination* with the boiler, the arrangement of the discharge-pipe and valve for the purpose of blowing out or discharging the contents of the boiler under pressure," substantially as set forth (fol. 80).

The Facts as to the 2d Boiler Patent.

The testimony shows that the defendants do not use the perforated well—consequently do not use the combination described—and that there was no novelty in the discharge-pipe and valve.

The only mechanical experts who have been examined consider that there is no infringement of either of the boiler patents.

THE WATT & BURGESS PATENTS.

Abstract of the Evidence.

See also abstract of the testimony in relation to the Mellier patent, part of which is applicable also to the Watt & Burgess patents.

JAMES McCRACKEN (witness for plaintiffs):

Fol. 137—Q. 4. Describes the process used by the defendants. They disintegrated the bamboo by blowing it from steam-guns at a pressure of from 160 to 180 lbs. to the square inch, whereby it was thrown into fibre.

It was then *boiled in an open tank, and then washed.*

Then it was taken to the alkali-boiler (pulping-boiler), and put under a pressure with alkali, from 40 to 60 lbs. to the square inch.

Then it was blown out and washed, and when they wished to make a white paper, it was bleached.

Fol. 138—Q. 5. As to the strength of the solution of the caustic alkali, "the general strength that was used and found best was from $2\frac{1}{2}°$ to 3° *per pound of bamboo*, but have used less and have used more."

Fol. 138—Q. 8. The $2\frac{1}{2}°$ to 3° *per pound of bamboo* was proportioned to the bamboo in the *dry* state.

Fol. 144—Q. 42. What was the quantity of the solution of caustic alkali of the general strength of $2\frac{1}{2}°$ to 3° which you said was proportioned to a pound of bamboo?

Answer. The same as I stated yesterday—one gallon to a pound, but I state only from recollection *and may be mistaken.* I have no data to go by in respect to the quantity per pound.

ROBERT DONALDSON (witness for plaintiffs):

Fol. 149—Q. 5. Produces samples of paper said to have been made by boiling materials in a solution of caustic alkali under pressure; says, "I was so informed by Mr. Fisher, from whom I received them."

Fol. 150—Q. 14. Have you any knowledge as to the material of which you say the several samples are made, except what was told you by Mr. Fisher or some one else.

A. I have no other knowledge except what Mr. Fisher told me.

Fol. 150—Q. 15. Did you see made the paper of which Exhibit "I" is a part.

A. No, I have not.

Fol. 150—Q. 16. Have you any knowledge in what manner the several exhibits were made—how the material was treated with caustic alkali, except what you have been informed by others.

A. No.

HUGH BURGESS (witness for plaintiffs):

Fol 153—Q. 4. Visited defendants' works at Brooklyn; they were using bamboo only.

Fol. 153—Q. 5. States what he saw and what he was told there by employees, as to the mode of treating bamboo.

Fol. 155—Q. 8. As to the alkaline solution used, states what Mr. Townsend told him; understood Townsend to say that, on making caustic soda on the premises, "equal parts of lime and soda ash were used."

(See this contradicted by Townsend, fol. 284, Q. 168, who says he used half the quantity of lime that he did of soda ash.)

Fol. 156—Q. 9. "Taking the quantities and proportions as given me by Mr. Townsend, the strength of the caustic alkaline solution is about 8° Baumé." (See fol. 284, Q. 168, Townsend's testimony, correcting this.)

Fol. 157—Q. 14. Produces samples "*said* to be all bamboo," &c.

Fol. 223—Q. 105. As to the conflicts between the Mellier and Watt & Burgess patents.

Fol. 159—Q. 22. As to experiments made by witness prior to obtaining the Watt & Burgess patent. Endeavors to explain why his process was either with or without steam pressure.

Fol. 161—Q. 23. Witness himself prepared the specification for the English patent.

Fol. 161—Q. 24. Refers to rough draft specification drawn up by him in 1852.

(*Note.*—Misquotes it; see the draft No, 6. folio 286. The words there are not "high-pressure," the word 'high" is omitted.)

Fol. 161—Q. 25. States why he did not claim boiling under

pressure. Had "ascertained that a process existed for boiling rope and rags under pressure, though at too low a temperature to pulp wood."

(*Note.*—Which he says, Cross-Inty. 106, folio 224, requires about 366° to 372° F., or about 140 to 150 lbs. pressure; and see Cross-Int. 63, fol. 216.)

Fol. 161—Q. 25. Believes the claim covered a boiling under such pressure as the nature of the wood required.

Did not *then* know that any attempt had been made to produce a pulp from wood.

Fol. 212—Q. 43. As to what steam-pressure he considers to be embraced in the reissued patent, he says: "We claimed in the patent a temperature at near or *about* 300° Fah., and I assumed that we had the right to vary the temperature, according to the material under operation, to about that point—that is, at near or about 300° Fah."

(*Note.*—The heat used by plaintiffs is not 'about" 300°, but very much above that, and witness shows that 140 lbs. pressure is necessary. Witness misquotes the patent; the word "*above*" is used—not "*about.*")

Fol. 212—Q. 44. Is asked how much below 300° would be within the process; answers, such a temperature as would effect the removal of the intercellular tissue.

Fol. 214—Q. 54. Considers 290° would be "*about*" 300° F.

Fol. 216—Q. 63. Pressure used by plaintiffs. "We practically use with non-resinous woods a pressure of about 140 lbs.; with resinous woods, a pressure of about 150 lbs."

Fol. 216—Q. 64. With caustic alkali 12° B, 140 lbs. is about equivalent to 366° temperature.

Fol. 216—Q. 65. Does not consider 366° "at, near or about 300°."

Fol. 216—Q. 68. Does not consider rags, linen and cotton ropes, to be vegetable substances within the patent, because in linen and cotton there is no intercellular matter.

Fol. 217—Q. 70. Understands the patent to embrace "wood and vegetable substances possessing ligneous tissues." Knows of no vegetable production that does not contain ligneous matter when it has arrived at maturity.

Fol. 223—Q. 101, 102. Before he applied for his patent of 1854, was aware that *rope* and *rags had been boiled in alkaline solution under pressure to make paper pulp.* Knew that a rotary boiler similar to Spofford's was in use in England for that purpose. Did not know the pressure used.

Fol. 223—Q. 105. "I consider that the reissued patent 1,449 embraces the Mellier patent."

Fol. 223—Q. 106. Discovered a new effect in 1853, by boiling in alkaline solutions. "*I found that a definite temperature was necessary* to obtain this desired end." *Woods* required about 366° to 372°. Vegetable substances of a less solid character than wood, a temperature of somewhere about 300."

Fol. 224—Q. 107. Unbleached hemp rope and flax are within the patent.

Fol. 224—Q. 109. Paper *pulp*, manufactured from hemp, flax, &c., may be boiled in alkaline solution, at a temperature above 290°, without violating the patent.

Fol. 225—Q. 112. As to the letter of April 7th, 1854 (Defendants' Exhibit A), to the commissioner of patents, on the original application for the patent.

Fol. 225—Q. 113. Plaintiffs do not use "the order or series of processes" described in that letter, in treating non-resinous woods.

Fol. 227—Q. 121. As to paper pulp made from straw by boiling in a weak alkaline solution, and without boiling a great length of time, at a temperature less than 290° F., the quality would not be "first class."

Fol. 224—Q. 109. As to the material which the defendants put into the pulping-boiler—"Suppose a party should take paper pulp manufactured from hemp, flax, or other vegetable fibres from which paper could be made, without any subsequent boiling in an alkaline solution, at a temperature above 290°, and should put that stuff into a boiler and boil it in an alkaline solution under a pressure of seventy-five pounds, would that be treating a vegetable substance within the meaning of the patent No. 1,449?"

A. "It would not."

(*Note*—See Rand's testimony, that coarse paper could be made from the material which the defendants put into their pulping boiler. Fol. 174, q. 17).

Fol. 229—Q. 125. Is shown a sample of pulp made by defendants' process from bamboo—says: "I believe that the greater part of the intercellular matter adhering to the fibre is removed by the oxydizing agency of the bleaching liquors."

Fol. 229—Q. 126. Plaintiffs, after boiling the wood chips in alkali, bleach the pulp in the usual way.

Fol. 231—Q. 132. Considers the process now used by plaintiffs to be the same as that patented in 1854, "because in the *first* treatment by caustic alkali, *boiling under pressure is referred to.*"

Fol. 231—Q. 135. Intended to include straw in the patent of 1854, boiled under a pressure "above atmospheric pressure."

Fol. 232—Q. 141, 142. Considers all vegetable substances containing ligneous intercellular matter, binding the true fibre together, to be "similar to shavings of wood;"—that raw flax and hemp are similar to shavings of wood.

Fol. 233—Q. 144. No definite temperature was stated in the patent of 1854, because he supposed that "from mentioning boiling under high pressure," he was entitled to its use to any extent that he desired.

Fol. 233—Q. 145. Was aware that hemp ropes had been boiled under pressure in alkaline solutions, to make paper. But the caustic alkali was comparatively weak, and the rag engine had to be used freely to tear open the fibre, and large quantities of bleach were used.

(*Note*—That argument may be pertinent if the reissued patent is to be treated as a patent for the use of a certain strength of alkali and for pulping by a single operation.)

Fol. 234—Q. 146. Intended the patent of 1854 to apply to all vegetable substances boiled in alkaline solutions, whether under pressure or in an open vessel, which could produce paper pulp.

Fol. 234—Q. 147. Knew that straw paper was made by boiling straw in an alkaline solution, but did not know it had been used, except for common yellow paper.

Fol. 235—Q. 148. The patent is not for any particular quality of paper.

Fol. 235—Q. 149. Believed, when he got his patent of 1854, it prevented others from making paper from straw, &c., by boiling in an alkaline solution *under pressure*, although the parties might not use the process claimed in the patent.

Fol. 235—Q. 150. As to the concealment of the alleged discovery of the necessity of using certain definite temperatures in treating *woods*—

He says, that when he applied for the patent, he "believed that *no one had ever thought of using alkali in "boiling under pressure* for the purpose of disintegrating "vegetable substances"!

(*Note*—See patents of Gros, Wright, Montgolfier, Coupier and Mellier's French patent, &c.)

Fol. 236—Q. 152. Nothing has been done in England under the English patent—no works established there.

Fol. 237—Q. 153. Wood paper pulp (ground wood) has been used in England.

Fol. 237—Q. 154. As to the mixture of rope with the wood fibre made by plaintiffs.

Fol. 237—Q. 156. "If you consider the first claim in your reissued patent of 1863, No. 1,449, to include any invention except what you disclaimed in your patent of 1854, state what it is?"

A. "What I consider was claimed in the first clause of the reissued patent of 1863, No. 1,449, did not include any invention except the use of boiling of vegetable substances in alkali, under pressure, as a process or preparatory process for the manufacture of paper from such vegetable substances."

Fol. 242—Q. 173. As to misquotation of the patent—"about" instead of "above." The word "above" was used in order to include a pressure up to as high as 500° (which would be 675 lbs).

Fol. 243—Q. 174. Is referred to the *New York Tribune*. Defendants' Exhibit D 2—says, it appears that "much of the intercellular matter has been removed by bleaching powders."

Fol. 243—Q. 175, 176. As to there being no oath that Watt & Burgess, were the inventors of the invention described in the reissued patents.

MORRIS L. KEEN (witness for plaintiffs):

Fol. 424—Q. 3. As to the pressure used by plaintiffs—it was 140 to 160 lbs.

Fol. 431, 434—As to the occasional use of the alternating process.

Fol. 436—Witness says that in his testimony in the interference case referred to, he declined to state the lowest pressure, on the ground that it was an exposure of the process. No man in plaintiffs' employ knows the pressure used now.

DR. RAND (witness for plaintiffs):

See fol. 371—Q. 1. Showing that this witness has but a slight knowledge of the manufacture of paper pulp, and of the processes and machinery used therein.

Fol. 169—Q. 8. Is of opinion that the processes used by the defendants are substantially the same as those described and patented by the Watt & Burgess reissued patents, because the defendants boil the bamboo in caustic alkali at a pressure from twenty to forty-five pounds. "By actual experiment I have found that a pressure of forty-four pounds per square inch above atmospheric pressure (*this being the universal meaning of the term steam pressure in this country*), with caustic alkali at 5° Beaumé and vegetable matter in proper proportion to said alkali for pulping purposes, corresponds to a temperature of 296° F.; with distilled water, this pressure corresponds to 294° F. The temperature claimed in the reissued patents Nos. 1,448 and 1,449 is at, *near*, or above 300° F."

Fol 170—Safety-valves and manometer gauges in this country are always graduated so as to express the pressure of pounds above that of the atmosphere.

That "14.7 pounds of the French gauge is O of the ordinary steam-gauge."

Fol. 170—Considers that the steam blowing is almost entirely mechanical, "and that *white* paper cannot be made by the usual process, of this blown bamboo, unless it be

previously boiled in alkali at a temperature near or above 300° F."

Fol. 174—Q. 17. Says of the substance produced by the steam-blowing process, that "*even after the alkaline treatment in the open tank, it can only be made into brown paper,*" which he does not consider to be paper pulp. "I should define paper pulp as a material capable of being made into *white* paper of fair quality, after bleaching by the usual process, without a large admixture of other paper-making material."

(Why is not pulp from which brown paper is made "paper pulp?"

The witness reviews the various patents and publications put in evidence by the defendants, and endeavors to show that none of them call for a *single-stage chemical process*, and a combination of all of the elements of the processes described in the patents of Watt & Burgess and Mellier.

Cross-examination of Dr. Rand:

Fol. 371—Q. 1. Has had no practical experience or acquaintance with the manufacture of paper or paper pulp, except that obtained by five visits to the plaintiffs' works and experiments made during the preceding summer and fall.

Fol. 371—Q. 4. Saw them making rags and rope into pulp for the purpose of admixture, at plaintiffs' factory.

Fol. 371—Q. 5. Describes the process used by plaintiffs to convert a log of poplar wood into pulp.

A solution of caustic soda of a strength of about 12° B. is used—60 per cent. of the weight of the dry pulp is the quantity of caustic soda used, or 20 per cent. of the weight of the wood in caustic soda. The boiling is at a pressure of 160 to 170 lbs., and sometimes higher is attained. This pressure is kept up for five hours.

Fol. 377—Q. 28. There is intercellulose in unbleached linen, a portion of which is removed by the preliminary boiling in caustic alkali, under pressure, preparatory to being bleached or made into paper.

Fol. 378—Q. 32. "A *certain percentage of caustic alkali* to the "wood and a *certain minimum temperature are requisite* "*to carry out the invention* set forth in 1,448 and 1,449,

" and these are different from the quantity of alkali and " temperature required in the process of treating wood " successively with alkali chlorine and alkali again."

Fol. 379—Q. 33. As to the effect of chlorine in removing the incrusting matter of the fibres.

Fol. 379—Q. 34. "If wood were treated with caustic alkali under pressure at a temperature below 300°, and then bleached with chlorine, could not a fair result of white paper be obtained, although inferior in quality to that which would be obtained if a preliminary treatment under a higher temperature with caustic alkali had taken place."

A. "Yes."

Fol. 379—Q. 35. "In all cases, must not the pulp obtained from wood be bleached by chlorine or equivalent bleaching agent before it can be made into white paper?"

A. "Yes."

Fol. 379—Q. 37. "Can you draw any marked line of temperature below 360° as a point for the alkaline treatment at which this subsequent disintegration by chlorine would not be requisite in the converting of wood into white paper?"

A. "I cannot."

Fol. 379—Q. 38. "Can you name any specific chemical property, so far as disintegrating wood is concerned, which a caustic alkaline solution, at a temperature of 300° Fahrenheit, possesses which is not possessed by a caustic alkaline solution at a temperature, say 290° Fah.?"

A. "Not having made any experiments below 306° Fahrenheit temperature, I cannot answer this question of my own knowledge; but I do not presume there is any specific difference between the action that takes place at those two temperatures."

Fol. 380—Q. 40. Was informed at the plaintiffs' works that 160 lbs. was the usual minimum temperature used there.

Fol. 382—Q. 61, 62. States that he considers the invention de-

scribed in the Watt & Burgess reissued patents to be different from the Coupier & Mellier patent, because by the Watt & Burgess patents, "the intercellulose is removed by the *single action of caustic alkali*, at the high temperature named," whereas, under the French patent, *part of that operation would be performed* by the *subsequent* bleaching process.

Fol. 383—Q. 63. States that he considers the Watt & Burgess process to be different from that described by *Regnault*, because, in the former, "the intercellulose is removed at a *single operation*, by boiling in caustic alkali, at the temperature named," whereas, under the French process, a part of the intercellulose is removed by alkali, the remainder by chlorine, followed by *another treatment with alkali, &c.*

(*Note.*—That is very similar to the original patent of Watt & Burgess, of 1854.)

Fol. 384—Q. 77. Admits that the specifications in the Watt & Burgess reissues do not show a papermaker the *proportionate* quantity of alkali required, nor what pressure to employ, and the time of the operation. The papermaker would have to ascertain by experiment.

Fol. 386—Q. 83. As to use of the rag-engine by plaintiffs to beat up the pulp.

Fol. 387—Q. 87. "In giving your answers as to the Watt & Burgess invention, patented in said reissue, have you considered it to be a process which produces a result such as Exhibit 24 by a single treatment in caustic alkali under pressure?"

A. "I have."

Fol. 387—Q. 89. "Have you any practical knowledge or experience on the subject of papermaking, other than that derived from your visits to the plaintiffs' works, and if so, what?"

A. "I have no other, except in so far as in my experiments in making pulps, as here testified to."

Fol. 387—Q. 91. Gave his testimony about the mechanical treatment of fibres required to enable them to felt in

pulp from information received at the works from Mr. Nixon, and he thinks also from Mr. Burgess.

Fol. 390—Q. 104. "Can you quote any part of the Watt & Burgess patents as reissued, Nos. 1,448 and 1,449, which convey the information that a temperature of 360° Fah., and the corresponding pressure is the proper one for treating *wood of any kind* or a temperature of 300° Fah. is too low a temperature for *certain woods*?"

A. "I cannot make such quotation."

Fol. 390—Q. 105. "Are there not vegetable materials which in your judgment would be completely pulped at a pressure due to 212° F. in caustic alkali?"

A. "Yes."

Fol. 391—Q. 110. Considers the quantity of alkali to the weight of wood to be important.

Fol. 395. Gives tables showing temperatures and corresponding pressures.

Fol. 390. Also a comparison of the hydrometers of Twaddell & Beaumé.

Fol. 391—Q. 111. The patent does not contain any indication of the *quantity* of the solution of a given strength to be used.

LEMUEL W. WRIGHT, mechanical and civil engineer, witness for plaintiffs as well as for defendants:

Fol. 292—Q. 1 to 4. Had a mill at Stockport, England, in 1839, for bleaching yarn, &c. Boiled the materials to be bleached in caustic alkali solutions, under pressure of from 40 lbs. to 80 lbs.

Is not a native of England. Was born in New Hampshire.

Fol. 292—Q. 5. Obtained a patent in England in 1843, for bleaching fibrous substances and making them into paper.

Fol. 125—Is referred to his patent calling for "high-pressure steam" in boiling straw, etc.

Fol. 293—Q. 7. Produces samples of white straw paper made by that process, Exhibits N, O, P, made from straw pulp at Chalford about 1848.

See fol. 412—Q. 93, correcting this. These samples were made in 1851 at Spring Mill, Chalford.

Fol. 293—Q. 8. The straw from which that paper was made was boiled in caustic alkali, under steam pressure from 40 to 80 lbs. The alkaline solution was of a strength of about 8°, marked by the hydrometer in use at that time (the English hydrometer Twaddell).

Fol. 293—Q. 9, 10. At the Great Exhibition of the works of industry of all nations in London, in 1851, exhibited specimens of paper made by him, as before mentioned, from straw, and got the prize medal. And at the request of the British Government, exhibited similar specimens in Paris in 1855. Produces letter containing such request from the Committee of the Privy Council. Exhibit R.

Fol. 294—Q. 14 to 16. When he was working his mill at St. Mary's, two Frenchmen, named Muller and Mellier, visited the mill to inspect the process. It was prior to 1845.

Witness sold his French patent to them for £6,000, but they became bankrupt, and did not pay.

Fol. 295—Q. 17. Witness took out an American patent for the same invention.

Fols. 396, 397—As to his manufacture of paper from wheat straw, in 1844, at St. Mary's Mills, Chalford, Gloucester county, England, he used a pressure of 40 or 50 lbs. (fols. 396, 397).

In the boiling at Stockport used 80 lbs. (fol. 399, Q. 20; fol. 401, Q. 39; fol. 411, Q. 86).

Fol. 400—Q. 32. Made about 15 tons a week at St. Mary's Mills.

Fol. 410—Q. 80. In making pulp for *white* paper from straw had two boilings with alkali instead of one; there was only one boiling with alkali when *brown* paper was made.

Fol. 404—Q. 50. By first boiling straw in alkali with lime, then crushing and beating and washing the material, then

boiling the pulp in caustic alkali at 40 lbs. pressure, a better pulp is made than by a single process of boiling the straw in caustic alkali at a higher steam pressure than 40 lbs to the inch (fols. 403, 404, Q. 50, 51).

Fol. 410—Q. 81. States the process used by him in making the pulp for white paper.

Fol. 410—Q. 82. Also in making brown paper.

Fol. 413—Q. 103. Describes his manufacture, in 1851, of pulp for white paper from straw at Spring Mill, which, as well as St. Mary's Mill, was at Chalford; the pulp was sent to Mr. Johnson's mill, in the county of Kent, and there made into paper under the witness' superintendence.

Fol. 411—Q. 91. About 1,500 or 1,600 weight only was made for that mill.

Fol. 413—Q. 103. The samples, N, O, P, defendants' exhibits, were made at the last named mill.

That paper was exhibited at the World's Fair.

Fol. 414—Q. 104. The paper was whiter originally than it is now; states why.

THOMAS HOWLAND (witness for defendants):

Fol. 256—Q. 1 to 5. Occupation, paper-maker; used a rotary boiler in the fall of 1852; it was made to stand 60 lbs. pressure; it was made for Beach & Howland, of Fort Edward, Washington county; it was put up in the fall of 1852.

Fol. 256—Q. 7 to 13. They boiled rags, Kentucky ropes and Kentucky bagging in that boiler, at 60 lbs. pressure; it was called a Spofford rotary boiler; saw a similar boiler used three years before, at Spofford's paper mill, boiling rags and Kentucky rope; understood that at that time a great many other mills were using such boilers for same purpose.

Fol. 257—Q. 12. Kentucky rope is rope taken off from bales of cotton made of Kentucky *hemp tow*—the poorest part of the hemp is the tow—*full of shives.*

Fol. 257—Q. 14 to 16. Had seen cotton waste thus boiled; effect of 60 lbs. pressure is to soften the shives and

seeds, so that the bleaching powders will bleach them white.

Fols. 316, 317—Q. 1 to 5. All the straw pulp made at defendants' works, in Brooklyn, was sent to Stockport, and was made into brown paper there; none was bleached.

Fols. 317, 318—Q. 10 to 13. Witness, in boiling rope and Kentucky bagging, in 1852, as before testified to, charged the boiler with soda-ash and lime, called caustic alkali; made about 1½ tons of white paper per day from the fall of 1852 to 1st May, 1853.

Cross-examined:

Fols. 323, 324—Q. 63 to 69. As to the pressure used by witness in 1852; the steam-boiler had a gauge set to blow off at 60 lbs.; the general rule was to use 50 lbs. to 60 lbs.; the pressure in the rotary boiler might be 1 or 2 lbs. less than 60 lbs.

"We considered 60 lbs. better than 50 lbs. at that time."

Fol. 324—Q. 73 to 75. They used about 25 per cent. of Kentucky hemp tow with rags to make white paper.

Fol. 257—Q. 17 to 20. Produces sample of white paper made by defendants from bamboo (Exhibit D).

JOHN P. TOWNSEND, witness for defendants:

Fols. 262, 2 3—Q. 2 and 3. Was superintendent of defendants' works at Red Hook for one year from 1st August, 1865; during the last six months of the operations there, made "half stock"—some of straw, some of bamboo; the straw pulp not made into paper there.

Fol. 263—Q. 3. Description of the defendants' process. The bamboo blown from the guns, then put in open boiler and boiled in spent alkali; then put in beating engine, beaten and washed; then boiled four hours under pressure not below 40 and not above 60 lbs.

Fols. 263—Q. 7. "Did you find any difference in the method, whether boiled under 40 lbs. or 60 lbs. pressure?"

A. "There was apparently no difference."

Fol. 264—Q. 12. As to the chemical solution used by defendants—5,000 degrees to 3,000 lbs. of dry stock; cost per degree about two-thirds of a cent; estimate that 3,000 lbs. dry stock yielded over 2,000 lbs. of paper.

Fol. 269—Q. 48. Used what is known to the trade as commercial caustic soda.

Fol. 269—Q. 53 to 59. Describes the composition of the caustic alkali made on the premises—lime and soda-ash.

Fol. 279—Q. 130. Nothing but brown paper pulp was made whilst witness was at the works.

Fol. 282—Q. 153. "In the first six months we *boiled our blown material in spent alkali in an open boiler*, and then took it out and drained it, and put it into the pressure boilers and gave it clean alkali without washing. In the second six months the most of the time, I think, we did not boil in spent alkali, but we washed in water, and then *put it in the beating engines*, and there washed and cleaned it (see p. 283, Q. 162, and sample of this pulp, Exhibit K). It was then pumped up into a receptacle and drained, and then was put into the pressure boilers and was given the clean alkali and boiled under pressure."

Fol. 283—Q. 167. With respect to the pulp sent away to be made into paper, is unable to prove what paper was made from that pulp.

Fol. 283—Q. 159 to 166. Produces samples of steam-blown material, &c.

Fol. 156—Q. 9. As to what witness told Burgess respecting the alkaline solution used by defendants, "He is incorrect. First, in stating the quantity of lime used. He states that I said the quantity of alkali and lime was the same. I used half the quantity of lime that I did of soda-ash. Secondly, he is incorrect in respect to the solution of alkali. The 2,500 gallons of alkali which he speaks of was mostly spent alkali, and about the quantity of liquid that we used for a charge in the two upright boilers. He speaks of it as being a charge for one, while in fact it was a charge for two."

Fol. 284—Q. 168, and see fol. 287, Q. 185. 1,000 gallons of spent liquor was put into the pulping boiler with *wet pulp* from the beating engine (fol. 282, Q. 153).

Fol. 286—Q. 181. There would be a saving of two-thirds of the alkali if the complainants, instead of putting chips of wood into their boilers, were to put into them the stuff, a sample of which witness has spoken about (defendants' Exhibit K)?

Fol. 287—Q. 182. "Suppose the blown and cleaned bamboo fibre to be put into the boiler dry and pressed, how much paper pulp could be made from a charge of one of the upright boilers at Brooklyn?

"A. I should think you could put in 10,000 lbs. of the dry pressed stuff. I do not think it would shrink over 30 per cent."

HENRY B. RENWICK, civil and mechanical engineer, witness for defendants:

Fol. 340—Q. 2. As to the *reissued patents to Watt & Burgess.*—The invention described therein is not substantially the same as that of the original patent of 1854, which does not show that any boiling in alkali will reduce shavings to pulp, but the contrary is stated. The inventions in the reissues are based upon pulp produced by boiling in alkali under pressure alone.

Fol. 342—Q. 4. As to the *French patent to Gros*—Shows its similarity to the reissues. "Both the Gros patent and the Watt & Burgess patent give the *strength of the caustic* alkaline solution, but neither of these state the amount of the solution necessary to be used in treating a certain amount of wood."

A temperature of four atmospheres would, with the alkaline solution described in Gros' patent, come within the limit of temperature presented by the Watt & Burgess patent.

The processes are substantially the same.

Fol. 343—Q. 6. As to the *German publications*, Ex. 34 and 35. The operations described therein are the boiling of straw in strong lye under a pressure of from 6 to 8 atmospheres,

which would give a temperature from about 320° to 343° F.

EDWARD S. RENWICK, consulting engineer and expert in patent causes (witness for defendants):

Fols. 349 to 353—Q. 10, 11, 12. *As to the Watt & Burgess reissues.*—The patent of 1854 is for a compound process. The reissued patents are not for the original invention, they are for a process not described in the first patent. States his reasons for this opinion fully.

Fol. 353—Q. 13. *As to Gros' Patent.*—It describes the same process as that set forth in the Watt & Burgess reissues.

Fol. 355—Q. 16. *As to* the *German publications.*—By strong lye is meant caustic alkali (that being usually used). "They describe the process of treating a vegetable substance by boiling in an alkali under pressure as a process or preparatory process for making pulp for the manufacture of paper from such vegetable substance, which is described as the first process in the said reissued patent No. 1,449. The pressures corresponding with the temperatures 322° and 347° being within the pressures corresponding with the temperatures at near or above 300° up to 500° prescribed in said reissued patent."

Fol. 359—Q. 17. As to difference between pulp produced from wood by the process described in the patent of 1854, and that produced by the process described in the reissues. States why he thinks there would be a difference.

Fol. 359—Q. 18. Does not think that "pure cellulose" is ever obtained in the manufacture of ordinary paper; if it were obtained, it would be the same result whether produced by a single boiling or otherwise.

Fol. 360—Q. 24. If *all* the intercellular matter were removed, it would not be fit for any kind of paper.

Fol. 361—Q. 27. Is of opinion that there would have been no infringement of the original patent, by boiling shavings

of wood in caustic alkali, of the strength of 12°, in a close vessel capable of containing a pressure equal to that caused by a temperature of 300°, and *thereby* producing pulp.

(*Note.*—That is by the single process mentioned, instead of the treatment first with alkali, then with chlorine, and then again with alkali called for by the patent of 1854.)

Fol. 361—Q. 28. If the specification had stated that pulp could be produced by the process last mentioned, it would have made no difference unless there had been a claim to it.

Fol. 361—Q. 30. "If Watt & Burgess, prior to the date of this English patent, had actually produced pulp suitable for the manufacture of paper from wood, by boiling chips or shavings of wood in a strong caustic alkaline solution at a high temperature, would you not consider the specification of the original American patent, as you have stated the substance of it in your answer to direct interrogatory 10, defective and insufficient in not describing and claiming this result?"

A. "No, I should not; I should consider it as I now do, a description of a substantially different invention from that referred to in the question."

Fol. 361—Q. 31. "In giving the last answer, do you assume the pulp obtained by the single operation, and that which is the result of the process described by you in your answer to direct interrogatory 10, to be the same or different?"

A. "I made no assumption as to the quality of the pulp; my answer was based upon the difference between the process or operation described in the 30th cross-question, and the compound process described in the original Watt & Burgess patent."

Fol. 3 2—Q. 32. "The original Watt & Burgess patent was not defective and insufficient in not describing and claiming a result that was obtained by a process substantially different from anything that is described in it."

ROBERT E. ROGERS, professor of chemistry (witness for defendants):

Fol. 572—Q. 4. Wood boiled in caustic alkali at 400 to 480 degrees—product worthless.

Fol. 572—Q. 6. Compares Watt & Burgess original patent of 1854 with the reissues of 1863. Shows the inventions are totally different.

The first patent was for a three-step—alternating—process. The reissues are for a single-step process.

Fol. 574—Q. 10. As to Gros' patent—how to prepare the solution described by Gros.

THE BOILER PATENTS.

ABSTRACT *of the Testimony for Plaintiffs.*

HUGH BURGESS:

Fol. 153—Q. 3. Visited the works of the defendants at Brooklyn.

Fol. 155—Q. 7. Says that "the boilers are provided *at the top* with a charging man-hole."

(See Townsend's testimony, correcting this, fol. 265, q. 18.)

Fol. 218—Q. 79. As to the stirrers in defendants' boilers, understood they were not successful, and that they thought of removing them, or perhaps had removed them.

Fol. 219—Q. 82. Considers that Keen, by his patent of 1859, "claims an arrangement of stirrers in connection with a boiler of that particular form, and position."

Fol. 219—Q. 81. Does not consider that the patent comprehends stirrers of all forms and all modes of operation.

The stirrers should be of the same character as described in Keen's patent.

Fol. 219—Q. 85. Stirrers are not used in the boilers employed by the complainants.

Fol. 239—Q. 162). *Keen's boiler patent of* 1863, witness considers "that the invention consists in a boiler placed vertically with the diaphragm, discharge-cock, substantially as described and arranged in the specification."

Fol. 239—Q. 163. Does not know whether there was such a perforated diaphragm in the defendants' boilers.

Fol. 239—Q. 164.) As to the difference between the discharge-valves in the two boiler patents.

DR. RAND:

Fol. 371—Q. 1. *Has no* acquaintance with the manufacture of paper pulp except that obtained from five visits recently to the plaintiffs' works, and experiments made the preceding summer and fall.

Fol. 171—Q. 11. Considers defendants' boilers are like plaintiffs' boilers, because McCracken says the pulp was blown out of defendants' boilers. "The pulp could only be blown out of a boiler by having an opening at or near the bottom of the boiler, furnished with a valve or its equivalent, substantially the same as in Keen's patent."

Fol. 367—Q. 58. *Keen's boilers*, patented in 1859 and 1863, compared with Wright's boiler, as described in Wright's American patent of 1847.

"The boilers resemble each other in one respect. "The contents are discharged through an opening in "the bottom of the boiler under steam pressure."

(And see fol. 384—Q 68.)

Witness adds: "Wright's boiler lifts its contents by steam pressure into a vessel placed above; Keen's boiler discharges its contents into the open air by the pressure of steam generated in the boiler itself, and not, as in Wright's, brought from a separate boiler."

Witness speaks of the supposed object and effect of this mode of discharging the boiler.

Note.—In the defendants' boilers, also, the steam is not generated therein, but is brought from a separate boiler. There is nothing in either of Keen's patents to make the distinction which Mr. Rand makes between a discharge of the contents into the open air and a discharge into a vessel.

As to Rand's remarks on the object of this mode of discharging the boiler, neither of the patents to Keen says any more about it than Wright and Watt & Burgess do when speaking about blowing out the contents of the boilers.

Witness says: "The discharge-valve in Keen's boiler is internal. In Wright's boiler the stop-cock is external and beneath the boiler."

Note.—In the defendant's boiler, also, "the stopcock is external and beneath the boiler."

THE BOILER PATENTS.

ABSTRACT *of the Testimony for Defendants.*

JOHN P. TOWNSEND, superintendent at defendants' works:

Fol. 265—Q. 18 Describes the mode of charging the upright boilers used by the defendants: "We charged them on the upper quarter; there was a perforated diaphragm situated *above the man-hole plate;* we charged the boiler *below* the diaphragm."

Fol. 279—Q. 126–127. Describes the discharge-cock: It was a plug-cock, directly attached to the boiler, and worked by a mitred gear.

Fol. 286—Q. 177. The stirrers were *useless.*

HENRY B. RENWICK, civil and mechanical engineer:

Fol. 328—Q. 3. The patent of 1859, No. 25,418, is either, first for a combination of a boiler of any form suitable for making pulp with an expansion chamber, and any kind of stirrers, and with a discharge-cock, so that the contents of the boiler can be blown off through it.

Or second, it is for a combination of a boiler with an expansion chamber with stirrers *constructed and arranged as described in the patent,* and with a blow-off cock.

Thinks the better opinion is that the combination is the latter one.

Describes the substantial construction and arrangement of the stirrers. "They are oscillating rods with vanes or arms projecting from one side only of the shaft, and the shafts being arranged in such manner that when the vanes are turned towards the periphery of the boiler, the boiler may be charged through the

man-hole without the stuff falling upon the vanes or stirring arms."

Fol. 329—Q. 4. Keen's patent of 1863, No. 38,901, is a combination of a boiler with a diaphragm and well.

Describes the object of that combination to be that "material introduced through the man-hole above the level of the diaphragm shall not fall upon or clog up the diaphragm."

Fol. 330—Q. 6. As to the patent of 1859. Defendants' upright boilers contain the combination first enumerated above, but not the combination enumerated second.

Fol. 330—Q. 6. As to patent No. 38,901, defendants' boiler has no perforated well, and therefore does not contain the combination, unless that patent is for a combination of any boiler for pulping with a blow-off cock.

Thinks that is not the proper construction (fol. 179, and see fols. 193 to 195).

Fol. 331—Q. 7. As to the *French patent to Wise*, in 1838.

The boiler is rotary; has an expansion chamber, blow-off cock, and a grating which serves to agitate the contents when the boiler is revolved.

"In the patent it is stated that the boiler may be made stationary and the stirrers caused to revolve within it."

Other forms of stirrers are described in the patent.

Fol. 331—Q. 7. *Wise's patent* does not contain the combination in patent No. 25,418, "unless one element of that combination be any stirrer that will stir the material and not stirrers constructed and arranged as in the patent."

Fol. 332—Q. 8. As to *Wright's American patent* of 1847.

Wright's boilers are vertical, have expansion chambers and blow-off cocks.

If the combination in patent 38,901 be the combination of any boiler proper for pulping with a discharge-pipe and valve, properly arranged with reference thereto, for the purpose of blowing out or discharging the contents of the boiler under pressure, then that combination is described in Wright's patent.

Fol. 233—Q. 9. There is nothing in defendants' boilers which is not described in either Wise's or Wright's patents.

Fol. 233—Q. 10. Whether the patent of 1859 anticipates the patent of 1863.

Fol. 338—Q. 27. Refers to the expansion-chamber in Wright's boiler.

EDWARD S. RENWICK:

Fol. 344—Q. 3. *Keen's Boiler patent* No. 25,418, describes a peculiar arrangement of stirrers—is not certain that this is one of the characteristic arrangements of the invention. If it be not, then defendants' boiler is similar to the one referred to.

Fol. 344—Q. 4. No. 38,901 is, 1st, for a boiler with a perforated diaphragm and a well (the use of which he explains); 2d, for the combination of a boiler with such diaphragm and well with a discharge-pipe and valve.

Fol. 345—Q. 6. Shows how defendants' boilers differ from that.

Fol. 346 and 347—Q. 7. As to *Wise's boiler patent*.—It anticipates Keen's patent 25,418, unless that be restricted to the peculiarities of the stirrers, &c.

Fol. 348—Q. 8. As to *Wright's boiler*.—It, like Keen's, is a closed vessel for boiling straw under pressure; has a stop-cock for discharging the contents from the lowest part of the boiler.

SUPREME COURT OF THE UNITED STATES.

No. 362.

THE FIBRE DISINTEGRATING COMPANY,
Appellant.
vs.
THE AMERICAN WOOD PAPER COMPANY.

Appeal from the Circuit Court of the United States for the Eastern District of New York.

Statement of Facts, Abstract of the Pleadings and Proofs; Opinion of the Court, Decree, and Statement of the Errors relied upon.

Statement of Facts.

The defendants disintegrate fibrous vegetable substances by Lyman's steam-gun process, for which they hold a patent, dated 3d August, 1858. The vegetable substance is first subjected to the action of steam, at a high temperature, in a close cylinder (called a steam-gun); it is then discharged from the gun by the force of the steam into the open air. The product is a coarse fibrous substance. The acid, resinous gummy and coloring matters are rendered *soluble*, so that they can be easily washed out, leaving a product which is very easily reduced to pulp, by the ordinary treatment with an alkaline solution.

The defendants, working under this patent, carried on the operations which are the subject of this suit. They made, dur-

ing the time covered by the bill of complaint, a considerable quantity of paper pulp from bamboo—nearly the whole of it was fit only for brown paper, and was made into brown paper, but a small portion was for white paper, or rather for paper of a whitish color, as a sufficient quantity of alkali was not used to make white paper, and the alkali was not *pure*.

The defendants also, by their said process, made a small quantity of pulp from straw—for experimental purposes—but this pulp was suitable only for brown paper, and was made into brown paper only.

The bamboo, after being disintegrated by the steam-gun, was beaten up into pulp—the acid, resinous, mucilaginous and coloring matters being washed out—or it was boiled in an open tub, in a weak alkaline solution, so as to eliminate the acid, resin, &c. It was afterwards boiled in a close boiler with a solution of caustic alkali, at a pressure not exceeding 60 lbs. to the inch.

But this was not pure caustic alkali, and the strength of the solution was not that called for by the Mellier patent.

Moreover, the disintegration was not completed by the use of the caustic alkali, but was, as in the old process of Coupier & Mellier, partially effected by the bleaching agent, chloride of lime; which was used in quantities sufficient to accomplish the double object of disintegration and a partial bleaching.

The testimony in this case establishes, beyond a doubt, the following facts:

1. Several French and English patents for processes for the conversion of straw and wood and other vegetable fibrous substances to pulp, direct a boiling of those substances in solutions of caustic alkali with steam pressure: for example, Wright's patent calls for *high* steam pressure, and Montgolfier's for steam pressure without limit.

Those inventors, however, do not claim that there is any novelty in the use of high pressure boiling in a caustic alkaline solution; they merely describe that as a part of their processes, the novelty of which consisted in other particulars.

2. The patents of Watt & Burgess (upon which the present

suit is brought, as well as upon the Mellier patent), claim that Watt & Burgess' invention, which is dated back to 19th August, 1853, embraced the use of high pressure boiling, with any kind of caustic alkali, and any steam pressure from 300° to 500° F. being called for.

3. The use of pure caustic alkali in the pulping process is directed in the *expired* patent of Coupier & Mellier. That patent calls for a boiling of straw in a close boiler, with steam pressure, with *pure* caustic alkali, to partially effect the disintegration, and directs the completion of the disintegration, together with the bleaching, by the use of chlorine after the alkali has been washed out of the pulp.

On 26th May, 1857, a patent was granted to Mellier, antedated to 7th August, 1854. It is for a boiler of a peculiar form, and for a process for reducing straw to bleachable pulp, by boiling the straw in a solution of pure caustic alkali of a certain specific strength, with steam pressure not less than 70 lbs. to the inch.

And the complainants claim that the defendants infringe that patent by the use of their process as above described. And this the defendants deny.

Straw paper, colored and white, was commonly made long before Mellier's patent.

The recent success of the manufacture is owing to—

1. The increase in the price of rags.
2. The reduction in the price of the chemicals used.
3. Improvements in the old process of restoring the alkali.

Abstract of the Bill of Complaint.

Fols. 1 to 6—The bill sets forth certain patents to Messrs. Watt & Burgess and to M. L. Keen, and deduces title thereto in the complainants, and alleges that the defendants have infringed the same.

(The decision of the court upon those patents was in favor of the defendants below, and the complainants appeal to this court from that decision.)

Fols. 6 to 11—The bill also sets forth a patent, dated 26th May, 1857, to M. A. C. Mellier, a native of France, for fourteen years, from 7th August, 1854, the alleged date of a French patent for the same invention.

Fols. 15 to 17—The plaintiffs claim, as assignees of this patent, and allege that the defendants have infringed the same.

Fols. 43 to 60—The bill sets out the opinion of Judge Hall, of the Northern District of New York, in a suit brought by Coe S. Buchanan, a former owner of the Mellier patent, against Howland and Palser.

(Those parties made white straw paper by boiling the straw with a solution of caustic alkali of the strength specified by Mellier, at a pressure of 130 lbs. to the inch (fols. 56, 57).

The judge held, *from the evidence* before him, that straw had only been boiled in open tubs before Mellier's patent (fol. 50); that pressure boiling had been only "*casual and incidental.*"

And he held that although the patent named a *minimum* temperature, it fixed no *maximum* (fol. 52).

Abstract of the Patent.

Fol. 35—The *patent* is for an alleged improvement in the manufacture of paper pulp from straw to be made into white paper.

And the alleged improvement consists in subjecting the straw "to a pressure of *at least* 70 *lbs.* on the square inch when boiling such fibrous matters in a solution of caustic alkali, *i. e.*, 'a solution of *pure* caustic soda (fol. 63), of *a strength of from* 2° *to* 3° *B;*'" and the patent asserts (fol. 37) that by means of submitting the straw "to a pressure of between 70 to 84 lbs. on the square inch" the proportion of alkali required to be used can be reduced to the strength specified; and that the pulp can then be bleached by the use of a weak solution of chloride of lime, viz., of a strength of from ¼ to 1½ degrees.

The patentee describes a particular form of boiler with a separate compartment for the steam heat (fols. 36, 37). (That boiler is not used.)

The claims are as follows:

Fol. 38.—" I do not claim the general use of caustic alkaline solu-
" tions, nor the employment generally of a close boiler
" for boiling straw or other vegetable fibrous substances.
" But what I claim as my invention, and desire to se-
" cure by letters patent, is the use of a solution of caustic
" soda (Na°) in a compartment of a *rotary* vessel sepa-
" rate from that which contains the steam-heat substan-
" tially as described.
" I also claim the *within described process for bleaching*
" STRAW, consisting in boiling it in a *solution* of *pure* caus-
" tic soda (Na°) *from* 2° *to* 3° *Beaumè*, at a temperature
" not less than three hundred and ten degrees Fahren-
" heit, *after* it has been soaked and cleaned, and *before*
" submitting it to the action of a solution of chloride of
" lime from one to one and a half degrees, substantially
" as described."

Abstract of the Answer.

Fols. 90-94.—As to the Mellier patent, the answer denies that Mellier was the first inventor.

Fol. 94.—That plaintiff's claim under it is inconsistent with their claim under the Watt & Burgess patents, and objects that the bill is bad for inconsistency and duplicity.

Fol. 95.—Objects that the Mellier patent is invalid; that Mellier was not an inventor within the meaning of the patent law.

That there was no novelty in boiling straw and other fibrous materials in a solution of caustic soda under pressure.

And that the effect of an increase of heat in facilitating the action of alkalis in disintegrating fibres, was well known and applied before by paper-makers in boiling their coarse stocks.

Fol. 95.—That the use of a pressure exceeding 70 pounds would not have been patentable, even if it had been new.

Fol. 121.—That it was not new.

Fol. 95.—That the defendants do not use 70 pounds pressure, nor the alkaline solution called for by the Mellier patent, nor do they treat straw, but claim the right to use any pressure and any kind of caustic alkali.

Fols. 116, 117.—Shows the defendant's process. The bamboo is disintegrated by the explosive force of steam, so that "the principal part of the gum, silex and other useless matter can be washed out by the application of water."

Being beaten and washed, "it is now pulp fit for coarse paper." It is then boiled in caustic alkali under pressure of about 20 to 45 pounds—a lower pressure will answer.

"The pulp being prepared as above mentioned, before being boiled in alkali, a small quantity of alkali suffices, and a short boiling at no more pressure than has commonly been used by paper-makers for more than a quarter of a century past."

Fols. 96 to 104.—The answer refers to various prior patents and publications, showing that there was no novelty in making white straw paper by boiling straw in a solution of caustic alkali, under pressure; no novelty in the use of *pure* caustic soda for that purpose; nor in the use of a pressure as high as 70 pounds; none in the bleaching process: and that various paper-makers named had, in the U. S., prior to the date of the Mellier patent, boiled fibrous materials in high pressure rotary boilers, using solutions of caustic alkali under high steam pressure.

Amended Answer.—(Record, fol. 1_0.)

Refers to certain additional patents and publications, showing want of novelty in Mellier's process.

It also states that Mellier's assignees had recently falsely and fraudulently set up enlarged and expanded claims under the said patent, claiming that it was without limits as to the material to be treated, and the strength and quality of the alkaline solution.

Replication, Record, fol. 125.

ABSTRACT OF TESTIMONY.

See also the abstract of the testimony relating to the Watt & Burgess patents, part of which is applicable also to the Mellier patent.

DR. RAND (witness for plaintiffs):

Fol. 46—Q. 116. "The temperature and pressure of the Mellier specification do not apparently correspond. He says: 'A pressure internally of the boiler equal to or exceeding seventy pounds, that is 300° F.' This apparent discrepancy results from the fact that in France, in stating pressures, the total internal pressure on the boiler is given, which is about fifteen pounds greater than that indicated by the safety-valve or gauge used in this country, which indicates the pressure above that of the atmosphere."

(The quotation from Mellier's specification is incorrect, the words being "that is *about* 310° F." (not 300).

Speaking of Wright's English patent of 1825 for bleaching, the witness says:

Fol. 366—Q. 55. "Mellier's specification calls for a caustic alkaline solution, *definite in quantity*, and has for its object the conversion of straw and other vegetable fibrous materials into pulp suitable for the manufacture of white paper. This it does at a *single operation*, and by a chemical means."

And speaking of Wright's English patent of 1843, he says:

Fol. 180—Q. 29. "It is only by repeated processes that he removes his intercellular tissue, if he removes it at all."

And speaking of Wright's American patent of 1847, witness says:

Fol. 367—Q. 57. "It differs from the Mellier patent, which converts straw and similar vegetable fibrous substances into pulp suitable for the manufacture of *white* paper by a *single chemical operation*, bleaching only, being necessary afterwards."

Fol. 367—Q. 57. "Wright's process is a complex one, depending rather upon mechanical than upon chemical means for disintegrating straw. Mellier gives a *fixed preparation of alkali*, and specifies *certain degrees of temperature*, which, from the construction of Wright's boiler, I believe to be higher than those used by him."

Referring again to Wright's process, he says:

Fol. 369—Q. 59. "Wright's process is more or less *a compound one*, in which he *does not trust to the boiling in alkaline solutions alone.* Wright uses weak solutions, and does not state the pressure he uses, which, from the nature of his apparatus, was probably considerably below the lowest of these pressures.

Referring to Coupier & Mellier's patent, witness says:

Fol. 183—Q. 35. "The patentees do not use a temperature above 230° F., and do not rely on boiling in alkali for pulping, but rather on the disintegrating effects of the hypochlorites."

Fol. 383—Q. 67. "Does the process of boiling wood in caustic alkali, as pursued at defendants' works, and as understood by you, fall within the claim of the patent of M. A. C. Mellier, of May 26th, 1857."

A. "The claim of the Mellier patent refers to *straw alone.*"

JUDGE BENEDICT'S OPINION.

January 7th, 1868 :

BENEDICT, J.

This is a suit in equity, founded upon five different patents relating to the production of pulp fit for the manufacture of paper, which patents, it is alleged, the respondents have infringed. The questions raised in the case are so similar to those already considered in other actions founded upon the s ame patents, and especially in an action brought by the same complainants in the Circuit Court of the Eastern District of Pennsylvania, and there decided since the commencement of the present suit, that I feel relieved of much of the responsibility which I should otherwise feel in disposing of questions of this character. In the light of these decisions, my way to a correct determination is not obscure.

As to two of the patents sued on, the patents reissued to Watt & Burgess, numbered 1,448 and 1,449, the determination of the court in the case referred to, furnishes an authority from which I should not feel at liberty, had I the inclination, to dissent.

In accordance with that authority, it must here be held that the Watt & Burgess patent, No. 1,448, which is for a pulp suitable for the manufacture of paper made from wood or other vegetable substances, by boiling the wood or other substances in an alkali under pressure as described, cannot be sustained as a valid patent for a new product. Aside from that authority, I should feel bound to say that it appears impossible to consider that to be a new material, patentable as a new product, which is simply a substance long well-known to exist in wood and other substances, left in a state "nearly pure," and, consequently, fit for the manufacture of paper on being bleached by the removal from it of the intercellulose with which it is found to be combined in wood. The patent No. 1,448 is for such a material as a new product, in the production of which, under the patent, if there be anything new, it is, as it seems to me, the process, not the product.

The same authority must also dispose of the complainants' case, so far as it rests upon the Watt & Burgess patent, No. 1,449, which is for the process of producing this material from wood and other vegetable substances, as described.

As regards this patent, the learned Judge of the District Court, who took part in the discussion of the Pennsylvania case, in his opinion, as delivered, makes the case turn upon the question of fact whether the process described in the reissued patent was invented by Watt & Burgess prior to the issue of their original patent, in 1853, and he finds, upon evidence, in substance, the same as the evidence before me in this case, that this process had not then been invented by Watt & Burgess. Such is also my conclusion; and I am also of the opinion that the reissued patent is for a process substantially different from any described in the original patent. So far, then, as the bill rests upon the two Watt & Burgess patents, 1,448, 1,449, it must fail.

But the complainants have not based their action upon the Watt & Burgess patent alone; they have also averred and proved the ownership of a patent issued to one Mellier, on the 7th day of August, 1857, and numbered 17,387. This patent is for the use of a vessel of a peculiar description, for heating the material in the manufacture of paper pulp, and also for a process of disintegrating vegetable matter for the purpose of producing pure cellulose fit for the manufacture of paper. It is the latter claim alone which is called in question here. This patent also was brought to the consideration of the court in the Pennsylvania case referred to, where the judges differed in opinion respecting it. It has likewise been considered and passed upon by the Circuit Court of this circuit, in the case of Buchanan *vs.* Howland, decided in Albany, March 23, 1863 (opinion by Hall, J.).

To the claim based upon the patent of Mellier, the first ground of defense taken here is, that the evidence does not show Mellier to have been the first inventor of the process described in his patent. The same point was taken in the Pennsylvania case referred to, and there Judge Cadwalader held with the complainants, and Mr. Justice Grier the contrary. In the Albany case, however, the patent was sustained by the court, as for a new and useful process described by Mellier. The evidence

before me upon the point in question differs somewhat from the evidence presented in the Albany case, but is substantially the same as that offered in the Pennsylvania case. I have considered it with care, and see nothing in it which should lead to a different conclusion from that arrived at by those experienced judges who have heretofore sustained the patent.

The next ground of defense is, that the Mellier patent is for a method of treating straw, and does not cover bamboo, which is the material mostly used by the respondents. This point I cannot consider to be free from doubt. In the opinion delivered by Judge Hall in the Albany case, the patent is always spoken of as a patent relating to straw; but in that case the infringement proved was in regard to straw, and the court had no occasion to consider, and expressed no opinion as to whether the patent extended to any other substance.

In the Pennsylvania case the point was fairly raised, and upon it Judge Cadwalader expressed the opinion that the patent would cover any fibrous vegetable substance requiring like treatment with straw for the purposes in view, and that wood was within its scope, while Mr. Justice Grier considered the patent to be confined to straw *et similia*. It appears to me quite manifest, from the language of the specification, that the patentee considered his process as applicable and beneficial in the treatment, not only of straw, but also of other vegetable substances. He uses throughout, the phrase "straw and other vegetable fibrous materials requiring like treatment." His description of his process nowhere limits it to the single article of straw, and his patent is for his process as described; but he does, in the last clause of his specification, say: "I also claim the within described process for bleaching straw, consisting, &c., * * * substantially as described." Now, his process described is not a process for bleaching, in the ordinary acceptation of that term, nor is it a process for treating straw alone. No person, looking at the whole paper, would fail to see that the patented discovery related to other material as well as straw; and in view of the peculiar phraseology of the last clause, which is called the claim, and of the intention

manifested elsewhere in the instrument, I incline to the opinion that, according to the principles applicable in the construction of patents, the last clause should not be held to be such a formal summing up and defining of the limits of the invention as to restrict the patent to the single substance there mentioned, and this must have been the conclusion of Mr. Justice Grier, as well as of Judge Cadwalader.

If, then, the patent extends to any other substance than straw, in the common and limited signification of the word, the respondents are within its scope by reason of their treatment of bamboo. They appear, at times, to have treated common straw, but their principal article is bamboo, which they use for the purpose of producing from it the desired pulp for the manufacture of paper—the stalk of this plant, which is the gigantic grass of the tropics, belonging to the same botanical order as wheat, oats, &c.

The defendants, by means of a peculiar process of their own, shiver into a mass of tendril-like shreds or strips, very like a mass of straw, which they then boil in caustic alkali under pressure, some times having previously boiled it in spent alkali in open vessels, and sometimes not. It is certainly a fibrous vegetable substance requiring like treatment for the purpose in question. It was treated by the respondents in the same way that they treated straw, and for the same purpose, and is in form and substance so very like to the common straw, that it must, in my opinion, be held to be within the scope of the Mellier patent.

But, again, it is said that the Mellier patent is claimed to be a patent for a single-stage chemical process, resulting in the production of pulp fit for paper, in which case the respondents do not infringe it, because their treatment is a two-stage process.

The principle of the Mellier discovery was, that the effect of a solution of pure caustic soda upon certain vegetable substances could be increased by the use of it under pressure, at a temperature not less than about 310 degrees, so as to result in the production of the nearly pure fibre *without resort to any other chemical process*, thereby saving both alkali and time. The *final process* used by the defendants is, as I understand the evidence, a process which invokes the same principle to

produce the same result, and in substantially the same way. If this be so, they do not escape the patent by a previous shivering of the material into shreds, or by a previous boiling it in an open vessel in spent alkali, or by putting it through a beating engine. The material so previously treated is still a fibrous vegetable substance, requiring to be treated by the Mellier process to produce the pulp desired; and when the defendants apply that process to it, they infringe.

But the respondents insist that they do not infringe the Mellier patent, because they use a pressure lower than the minimum pressure required by the Mellier process, which they claim to be the pressure represented by 70 lbs. upon the steam-gauge. Upon this point, I concur with Judge Cadwalader in the opinion that the minimum pressure of the Mellier patent is the pressure indicated by 55 lbs. upon the steam-gauge, instead of 70 lbs. It is true that the patent designated 70 lbs., but it says internal pressure, and gives 310° F. as the corresponding temperature. Now, 310° F. is not a temperature corresponding with 70 lbs., as indicated by the steam-gauge; and it is quite evident, I think, that the patentee, in mentioning 70 lbs., had in his mind the French Tables, which differ from the American Tables, and according to which, the weight of one atmosphere, $14\frac{7}{10}$, must be deducted to give the gauge-pressure intended to be indicated. Nor does the statement in the specification, that "a steam-gauge properly fixed will enable one to ascertain when the pressure had attained the required degree," appear to me to be inconsistent with this construction. Any skillful person must see from the specification that the internal pressure was to be considered; and that pressure he would ascertain by adding an atmosphere to the reading of the gauge. According to the evidence, the respondents have at times used an external pressure of 60 lbs. equivalent to an internal pressure of 75 lbs., running down, it is true, at times, as low as 40 lbs.; but their claim is to the right to any rate of pressure, which, according to the views here expressed, is untenable.

So, too, in regard to the strength of caustic alkali used.

The respondents must be considered within the Mellier patent, which designated for straw a strength of from 2° to 3° B. The testimony of the respondents' witness, as explained

by the respondents, gives a strength *of less* than $3\frac{1}{2}^{\circ}$ B., and used by them, which would bring them fairly enough within the scope of the patent in question. I have thus considered the principal objection made to the complainants' demand, as based upon the Mellier patent, and my conclusion is, that the decree must be in favor of the complainants, so far as that portion of their claim is concerned.

There remains to be considered the two boiler patents which are set out in the bill, as to which it seems sufficient to say that the first boiler patent of Keen, No. 25,418, is for a combination of which the stirrers described are a material part; the evidence, however, shows that the stirrers are not used by the respondents; not using the complainants' combination, they do not infringe his patent. The second boiler patent of 1863, No. 38,901, is also for a combination of which the diaphragm and well are material parts. The respondents use no well with the diaphragm, but charge their boiler below the diaphragm.

There is then no use of the defendants' combination secured by the patent. So far as the complainants' case rests upon these two boiler patents, it must fail.

The decree must accordingly be in favor of the complainants, the terms of which may be settled on notice to the opposite party, when I will also dispose of the question of costs.

March 24th, 1871.

ABSTRACT OF THE DECREE.

Fol. 129, 130—Adjudges that the Watt and Burgess patents are void.

Fol. 130—That the Mellier patent is valid—that Mellier was the original and first inventor of the improvements described and claimed in the said patent. That complainants have a good title to the patent.

Fol. 131—That the defendants "infringed upon the said patent."

It appearing that no profits had been made by the defendants by the infringement aforesaid, it is ordered that the complainants receive nothing of the defendants by reason of the infringement.

Fol. 132—4th. "That a perpetual injunction be issued in this suit in accordance with this decree, enjoining and restraining the said defendants from using the said process secured by the said patent to the said Mellier as aforesaid, or infringing the exclusive rights of said complainants under the same."

Fol. 132—Adjudges that the defendants have not infringed Keen's boiler patent of 1859.

Fol. 132—That defendants have not infringed Keen's boiler patent of 1863.

Fol. 133—That the bill of complaint, so far as it relates to the Watt & Burgess and Keen patents, be dismissed, and that no *costs* be allowed to either party.

STATEMENT OF THE ERRORS RELIED UPON BY THE DEFENDANTS.

We have to look to the opinion of the court, filed in the case, to ascertain what are held to be the limits of the Mellier patent, and in what the alleged infringement consists, and what the defendants are enjoined from doing.

It is submitted that the court in rendering the said opinion and decree, erred in holding that said patent to the said Mellier was a valid patent, and in holding that the defendants infringed the same.

On behalf of the defendants, it is contended:

As to the absence of invention, That the Mellier patent is invalid, because it is merely for a combination of the use of a specified degree of steam pressure with a specified solution of pure caustic alkali in boiling straw to reduce it to bleachable paper pulp; and that there was no novelty in the high pressure boiling nor in the use of pure caustic alkali, and that there was nothing patentable in the combination of the particulars described, and therefore that the court erred in holding the patent to be valid.

2. *Estoppel.*— That the complaints are *estopped* from alleging in this suit that Mellier was the inventor or discoverer of the use of the pressure or temperature called for by his patent in boiling straw with caustic alkali to make paper pulp, as the complaint alleges that such invention or discovery had been previously made by Watt & Burgess upon whose patent, as reissued, this suit is brought as well as upon the Mellier patent.

That the court therefore erred in holding that Mellier was the inventor or discoverer of the use of such high pressure or temperature in conjunction with caustic alkali for the reduction of straw to pulp.

3. *Prior use of high pressure.* — It being proved that as early as 1852, it was the practice of paper-makers, in the U. S. to make white paperfrom hemp tow, cotton seeds, &c., by boiling the same in a solution of caustic alkali, under a pressure of 60 lbs. to the square inch. And it being also proved by various patents and publications prior to the date of Mellier's alleged invention, that the use of steam pressure without limit, with caustic alkali was called for in the processes described therein ; and that a higher pressure than that called for by the Mellier patent had been used in reducing straw to pulp, the court erred in holding that there was novelty in the use of $55\frac{3}{10}$ lbs. steam pressure to the inch in boiling fibrous substances with caustic alkali to reduce them to pulp, and that the defendants infringed by the use of such last mentioned pressure.

4. And in behalf of the defendants it is further contended that, assuming the Mellier patent to be valid, it is not established by the pleadings or testimony in the case that the defendants infringed the patent.

5. *Assuming the patent to be valid for the combination.*—It is not shown that the defendants used all the elements of the combination, viz., (1) the specified pressure, (2) the specified strength of alkaline solution, (3) the quality of caustic alkali called for.

That the court erred in holding that there was an infringement of the patent without the use of all the afore said elements.

6. *Bleachable straw-pulp not made by the defendants.*—It is not shown that the defendants treated straw to make a bleachable pulp ; but it is proved that the straw pulp made by the defendants was treated by a *compound* process for the manufacture of brown paper only.

That the court erred in holding that the defendants had infringed the Mellier patent in making paper pulp from straw.

7. *Bamboo not within Mellier's patent.*—It is not shown that defendants treated any fibrous material which is within the scope of the Mellier patent,—Bamboo not being straw, nor a material which, on being treated as straw, is directed by the Mellier patent to be treated, could be converted into bleachable pulp.

That the court erred in holding otherwise.

8. *The prepared fibre.*—That the prepared fibre which the defendants boiled in caustic alkali under pressure, and which, before being so boiled, was capable of being made into paper without any further chemical treatment, is not a material within the scope of the Mellier patent.

That the court erred in holding otherwise.

9. *Steam pressure used by defendants.*—It is not shown that the defendants used the steam pressure called for by the Mellier patent.

That the court erred in holding that the limits of that patent included the use of a steam pressure of $55\frac{3}{16}$ lbs. by the English and American gauge, and that the defendants infringed by the use of that pressure.

10. *Pure caustic soda.*—It is not shown that the defendants used a solution of *pure* caustic soda.

That the court erred in holding the absence of such proof unimportant.

11. *Weak alkaline solution.*—It is not shown that the defendants used the *strength* of alkaline solution prescribed by the patent.

That the court erred in holding that the use of any solution of a *less* degree of strength than 3° B. (however weak such solution might be) was an infringement.

And further erred in holding that the use by the defendants, of such solution of a strength less than 3° B. had been proved ; there being no such proof.

12. *The defendants' disintegrating process.*—It is not shown that the defendants reduced any fibrous vegetable sub-

stance to pulp (bleachable or otherwise) by the use of anything invented by Mellier,—that the practice of boiling vegetable fibrous substances in solutions of caustic alkali under pressure is old, and consequently the addition of that process to the preparatory process of the defendants' cannot constitute a violation of the Mellier patent.

That the court erred in holding otherwise.

13. *No novelty in white straw paper.*—That the manufacture of white paper from straw, by boiling it in a caustic alkaline solution under pressure, not being new, the court erred in holding that Mellier was the inventor of that manufacture.

14. *Defendant's compound process.*—That the defendants' process with the steam-gun rendered the resin and acid of the wood soluble, and accordingly the resinous, acid, gummy and coloring matter was first eliminated by boiling with spent alkali in an open tub, *or* by beating up and washing the steam-blown fibre in a rag-engine and reducing it to pulp before the boiling under pressure

That the court erred in holding that the defendants' process with the steam-gun merely rent and split the bamboo, and that the material so rent and split, was sometimes without any further previous treatment, boiled with caustic alkali under pressure.

And that the court erred in holding that the use of the defendants' compound process, including as it did a disintegration before as well as after the pressure boiling, was an infringement of the Mellier patent.

15. *The patent is not for undefined pressure.*—That the court erred in holding that the patent would be infringed by using a pressure or temperature of "*about*" that named in the patent as the minimum, meaning thereby that the use of a pressure less than that named as the *minimum* would be an infringement.

And the court erred *in enjoining the defendants from using* such undefined pressure and temperature.

THE MANUFACTURE OF STRAW PAPER AT AND PRIOR TO THE DATE OF THE MELLIER PATENT.

1. Common wrapping paper is generally made from straw, by boiling the same in an open tub with lime.

2. When a better article was required, the straw was boiled with soda ash and lime, *i. e.*, caustic alkali in a close boiler, *i. e.*, under pressure.

3. It was known that the quality of the paper depended upon the strength of the caustic alkaline solution and the time of boiling and the temperature of the boiling liquor.

4. It was known that time would be saved as well as alkali by using a closed boiler, so as to have a heat considerably above that of boiling (212°). Sometimes a rotating pulping boiler, such as that patented by Spofford in 1840, was used, the heat being supplied in the shape of steam generated in a separate boiler, or fire heat was applied directly to the pulping boiler.

5. It was known that the caustic alkali should be free from lime when the pulp is to be bleached, so as to make white paper.

6. The pulp thus made was washed, and for white paper was bleached, chloride of lime being commonly used for that purpose.

7. When a strong solution of caustic alkali was used it was evaporated and incinerated, whereby all the vegetable matter was consumed, leaving the soda ash to use over again.

8. The straw pulp (bleached or unbleached) was beaten up very fine in a machine, called by paper-makers the rag-engine. The pulp, thoroughly diluted with water, was passed to the ordinary paper machine, and made into paper in the same way that rag paper is made.

9. Some manufacturers preferred to boil with a weak alkaline solution, and complete the disintegration by the use of strong bleaching liquor—the bleaching powders being cheaper than caustic alkali, but it was found that very strong bleaching liquor injured the fibre.

It is not pretended that at the date of Mellier's patent there was any novelty in any of the particulars above specified.

Straw paper of all kinds was commonly made; printing paper, for newspapers, as well as ordinary wrapping paper.

It remained, then, only to make improvements to cheapen and improve the quality of the straw paper.

The manufacture of Wood Paper at and prior to the date of the Watt & Burgess Patent.

It is a mistake to suppose that at the date of the Watt & Burgess patent there was any novelty in wood paper. The patents of Mongolfier, Gros, &c., in evidence in this case effectually dispose of that pretension. They made wood paper by boiling the wood in caustic alkali under steam pressure.

And as to the suggestion that they did not make their pulp by a one-stage chemical process, that amounts to nothing.

On the score of economy, thoe processes may have been superior to that described in the Watt & Burgess patent (especially in the absence of alkali restoring apparatus); at all events there is no evidence in this case to show the contrary.

Nor is it material to consider whether the wood paper made by Mongolfier, Gros, &c., was as good or as white as that made by the plaintiffs in this case. That is a question of no legal importance.

In *Ure's Dictionary of Arts, Manufactures,* &c. (Ed. of 1861), title "Paper, Manufacture of," the antiquity of wood paper is noticed, and is traced to China.

"Certain it is that the art of making paper from vegetable matter reduced to pulp was known and understood there long before it was practiced in Europe, and the Chinese have carried it to a high degree of perfection. Several kinds of their paper evince the greatest art and ingenuity, and are applied with much advantage to many purposes. One especially, manufactured from the inner bark of the bamboo, is particularly celebrated for affording the clearest and most delicate impressions from copper plates, which are ordinarily termed *India proofs.* The Chinese, however, make paper of various kinds, some of the bark of trees, especially the mulberry tree and the elm, but chiefly of the bamboo and cotton tree, and occasionally from other substances, such as hemp, wheat or rice *straw.*"

A description of the Chinese manufacture of paper from bamboo is given. The bamboo is macerated, then boiled in kettles, and then reduced to pulp in mortars, from which pulp the paper was made by hand-molds, pretty much as it used to be made in Europe before the introduction of the machine of Louis Robert, in France, towards the close of the last century.

Speaking of *straw* paper, it is stated that the cost of producing two papers of equal quality, one entirely from straw and the other entirely from rags, is about equal, owing to the great waste which straw undergoes in the process of reduction to pulp, and the cost of the preparation, which includes power, labor and chemicals, being so very much greater in the case of the straw, from two to three times as much as that of rags.

"In order to reduce the straw to a suitable consistency for paper-making, it is placed in a boiler with a large quantity of strong alkali, and with a pressure of steam equal to 120, *and sometimes to* 150 *lbs., per square inch;* the extreme heat being attained in super-heating the steam after it leaves the boiler, by passing it through a coiled pipe over a fire, and thus the silica becomes destroyed and the straw softened to pulp, which, after being freed from the alkali by washing it in cold water, is subsequently bleached and beaten in the ordinary rag-engine."

Paper has long been made from many kinds of vegetable fibrous substances.

"To convey some idea of the number of substances which have been really tried. In the library of the British Museum may be seen a book, printed in Low Dutch, containing upwards of sixty specimens of paper made of different materials, the result of one man's experiments *alone*, so far back as the yaar 1772. In fact almost every species of tough fibrous vegetable and even animal substance, has at one time or another been employed; even the roots of trees, their bark, the brine of hops, the tendrils of the vine, the stalks of the nettle, the common thistle, the stem of the holyhock, the sugar-cane, cabbage-stalks, beet-root, *wood-shavings*, saw-dust, hay, *straw*, willow, and the like."

The Alkaline Solution ; How Made ; Its Chemical Effects.

The solution of caustic alkali is made by dissolving the soda-ash of commerce with a certain quantity of lime, the clear liquor being drawn off for use when white pulp is to be made from straw. And when *pure* caustic soda is wanted, care must be taken to have the right proportions of lime and soda-ash.

When the caustic alkaline solution is used for cleaning rags, they are usually boiled with the lime and soda-ash mixed together.

When, in making white straw paper, it is desired to avoid a yellow tint, a solution of pure caustic soda is used, because the lime has some affinity for the coloring matter in the straw, and serves to fix the color.

There is in rye straw about 40 per cent. to 50 per cent. of fibre or cellulose, the rest being intercellular matter, silex, amylaceous matter, &c.

Some of the cellulose is lost or wasted in the conversion of the straw into paper.

The caustic alkali acts less upon the cellulose than upon the other constituents of the straw. It dissolves or decomposes the intercellular matter, and dissolves the silica, and acts upon the coloring matter and albumenoids or nitrogenous matters.

Heat renders the chemical action of the alkali more active.

The alkali effects the separation of the fibres by dissolving the silex, gum, and coloring matter which hold the fibres together—the alkali so acting forms a soluble silicate of soda or potash, and soluble soaps, so that the extraneous matters can be removed by washing, leaving the fibres soft, and in a condition to bleach readily.

The action of the alkali also liberates much of the coloring matter which is then washed out with the alkaline liquor and then the chlorine acts satisfactorily upon it, the coloring matter remaining, so that a good bleach can be obtained.

The grades or qualities of the paper vary, of course,

according to the quantity of intercellular matter mixed up with the fibre and the extent to which the bleaching process is carried.

While heat adds to the solvent power of the alkaline bath, a very high degree of heat injures the fibre of the straw, and the yield is smaller than when a moderate degree of heat is used, and such moderate heat is sufficient to dissolve the silex and the gummy parts of the straw, and to discharge the bulk of the coloring matter.

Improvements in bleaching lead the way to the use of moderate heat, and a moderate quantity of alkali in the process of disintegration by boiling in caustic alkali under pressure.

It is the heat which increases the action of the alkali, and when we speak of pressure it is only to signify the degree of heat represented by such pressure.

Bleaching Paper Pulp.

The bleaching is usually effected by a solution of pure chlorine liquor, made from chloride of lime, or what is commercially known as bleaching powders. The powders are put into a tank or other suitable vessel with water, stirred up, and the clear liquor drawn off. The strength is tested by a hydrometer. Mellier says that a strength 1° to 1½° Beaumé's hydrometer will bleach straw which has been boiled about three hours at a pressure between 70 to 84 lbs. in a solution of pure caustic soda of the strength of 2° to 3° B. But that is not shown to be the fact.

The chlorine acts to some extent as a solvent or disintegrator of the intercellulose remaining in the pulp.

The chlorine is cheaper to use than the alkali, and acts with much energy upon portions of the intercellular matter; it decidedly prefers the intercellulose, but when that is nearly removed it then begins to attack the fibres.

With an excess of chlorine the fibres are weakened or rotted.

The art of bleaching is very ancient.
Ure's Dictionery, title Bleaching.

"Egypt and the East seem to have been the teachers in bleaching. From Egypt were obtained alkalies *and soda mixed with lime.* Both lime and alkalies were used in the process. Potash or the ashes of plants was also used."

"The Latin method of obtaining white cloth is very well preserved, and as they got their *caustic soda* from Egypt, it is probable that they got also their process."

There is no proof in the present case showing that the action of a specified strength of caustic alkali, at a specified temperature, upon the intercellular matter of straw consists in the chemical combination of the alkali and intercellulose tissue, and there is no attempt to show that Mellier discovered, or claimed to have discovered, any such chemical combination, so as to assimilate the case to that of Goodyear.

Comparative advantages of high or low pressure boiling and weak or strong alkaline solutions.

Even at this day there is a difference of opinion as to the respective merits of very high pressure boiling with weak alkali, and low pressure boiling with very strong alkali.

When the latter is used, the alkali is saved and used again.

Again, there is a further difference of opinion as to whether it is more economical to use weak alkali and strong bleaching liquor, or strong alkali and weak bleaching liquor.

And still further, there is a difference of opinion as to whether it is better to boil quickly, at very high pressure, with weak alkali, or slowly, with the same strength of alkali, at a lower temperature—about 250° to 300° Fah. —the boiling being continued for nine or twelve hours, instead of three hours.

Publications, quoted by Plaintiffs' Counsel, to show the History of the Manufacture of Straw Paper.

The plaintiffs' counsel, in the court below, referred to several publications (not in evidence) to show the state of the art of reducing fibrous vegetable substances to paper pulp prior to the date of the Watt & Burgess patents.

Those publications show very clearly that there was no novelty in the manufacture of paper, whether colored or white from straw by the process of boiling the straw in a solution of caustic alkali under pressure. It was claimed, however, by plaintiffs' counsel, that their manufacture of paper from wood and straw by a single-stage chemical process was new; the disintegration being effected solely by the boiling in a solution of caustic alkali under a certain pressure of steam, which they distinguished from processes where the disintegration is partially effected by other means; for example, the Coupier and Mellier process, where the bleaching liquor is used for the double purpose of completing the disintegration and, at the same time bleaching.

Mr. Jenckes says (argument in the Fibre Dis. Company Case, p. 29), that in the year 1826 "the use of chemicals in the manufacture of paper from straw was a recognized fact. As early as 1810 the manufacture of paper from straw was described in the *Encyclopedia Britannica* as a process rather chemical than mechanical."

Mr. Jenckes, in his argument in the Heft case (page 2), traces the history of the Wood Paper Company. He says the company was formed in 1863, and prosperously manufactured paper directly from wood; and he adds:

> "This was in the height of the paper famine, when there was a great dearth of all the old raw material. Paper had reached a price of unprecedented height."

Mr. Jenckes quotes (argument in Heft case, p. 21) remarks of Dr. Lyman Playfair, in 1854 (published in Year Book of Facts, 1855), stating various reasons why

only *partial success* had attended efforts to furnish new raw materials for paper. Some fibrous materials cost too much to bring them to the proper condition that they could not compete with rags; others lost too much in weight; others were difficult to bleach.

This shows that it was merely a question of comparative cost. The elements of the comparison were constantly changing. Latterly, Esparto grass has been extensively used, especially in England.

Mr. Jenckes quotes (argument in Heft case, p 22); another book, published in London in 1860, entitled "Novelties," etc., which is to the effect that a straw paper factory at Bermondsey had failed; "the straw paper was neither fine enough nor strong enough to command an adequate price. So it died a commercial death."

It does not state whether it was white or colored straw paper.

We do not see for what purpose this quotation is made. It serves, however, to show that in the year 1860, twelve years after Mellier's French patent, the time had not yet arrived in England for the manufacture of white paper from straw by *any* process whatever; perhaps because the chemicals required were too dear, or rags were too cheap.

Speaking of *Coupier & Mellier's* patent of 1851, Mr. Jenckes says (p. 49):

> "The defendants say that they do not use pure caustic alkali. If they use it with lime in the same vessel, the reason why *the paper they produce is yellow* is evident, because of the presence of the lime. If they draw it off separately, and use the pure caustic alkali itself, then they use the original invention of *Coupier* & Mellier, which is *now public property*. It was once our property, but the patent has now expired."

He adds that *Coupier* & Mellier, by boiling the straw in the solution of pure caustic alkali, "then washing it and treating the product with chlorine, they could make a fair pulp."

Referring again to the patent of *Coupier & Mellier*, in

the argument in the Heft case, Mr. Jenckes says (p. 23), that Coupier & Mellier obtained a patent in France, in 1851, for making white paper directly from straw, "by *purely chemical action.*" That they boiled the straw in a *strong* alkaline solution in a vessel "in which the temperature could be carried only a *few degrees beyond* the boiling point," then treating the resulting material with chlorine of sufficient strength "to *complete the disintegration* of the fibres by removing any interstitial matter which might remain after the treatment with alkali. From this invention fair white paper was produced from straw," etc.

Mr. Jenckes, in the same argument (p. 152), says:

> "If you point me to the product of Mr. Wright's patent, I say that that contains foreign ingredients which deteriorate the quality of the paper. But here is something perfectly pure, susceptible of the highest degree of bleaching, making a more perfect article of the kind than any material known."

This is a great exaggeration.

The plaintiffs mix rags, etc., with their wood pulp (Rand, fol. 371, q. 4.

The paper made by plaintiffs is very inferior to paper made from cotton or linen rags. It lacks tenacity and the color is bad, and so much chloride of lime is used to bleach with, that it would be unsafe to print books on it. Many editions of valuable books have been lost in consequence of the destructive effect of the bleaching liquor used in the manufacture of the paper on which they have been printed.

Mr. Jenckes (argument in Fibre Dis. Co.'s case, p. 62) mentions the fact that sometime in 1857

> "The parties then working under the Watt & Burgess patent stopped work awhile, and then began to *work on rags;* the price of paper and of rags being very low."

This may be borne in mind when reference is made to the stoppage of Wright's, Mongolfier's and other processes at earlier periods.

Mr. Jenckes quotes (argument in Heft case, p. 99) from the "Annual of Scientific Discovery for 1855" (p. 109), a passage respecting the conversion of straw into white paper, in which it is stated that

> "The process, as ordinarily pursued is a simple one, *and not covered by any patent.*
>
> "The silica investing the straw, together with much gum and coloring matter, is removed by the action of a caustic alkali.
>
> "The alkali effects the separation of these substances by uniting with them and forming soluble silicate of soda or potash and soluble soaps.
>
> "It is claimed that a large part of the alkali so expended may be recovered by evaporating the residuary liquors and calcining the deposited matter. Theoretically this can be done, practically, with economy, it cannot.
>
> "In these operations, and in bleaching, the straw suffers a depreciation in weight of at least sixty per cent., and is then inferior to rag stock."

The opinion that the alkali could not be practically recovered with economy is now known to have been erroneous. It is the common practice now to recover a large part of the alkali by the method above described, viz., "by evaporating the residuary liquors and calcining the deposited matters."

That is done at the plaintiffs' works, and without it their manufacture would even now be unprofitable. With such restoration of the alkali, *white* paper could probably have been manufactured from straw at a profit even prior to 1855, although paper and rags were then cheaper and chemicals dearer than they are now, and straw was not so cheap in England as in the United States.

Another extract from the "*Annual of Scientific Discovery for* 1863" is given by Mr. Jenckes to the following:

> "*Straw.*—For many years the attempt has been made to render the fibre contained in straw *profitably* available for the production of *white* paper, but with indifferent success, until *within the last year*, when the problem has been solved beyond a doubt. This realization of the desired end is effected by boiling the straw in an alkaline lye in a rotary boiler, under a steam pressure of from *one hundred to one hundred and forty pounds per square inch.*"

It is to be noted that this was in 1863, when there was a paper famine. The time had arrived for the use of straw as a substitute for rags, and it is to be observed that the supposed discovery herein referred to was not the use of 70 lbs. to 84 lbs. steam pressure (the highest limit named by Mellier), but 140 lbs. There is no proof that Mellier ever used any such pressure. Evidently he did not know that it was necessary or *useful* to use a higher pressure than 84 lbs., for he says:

> "By means of submitting the straw or similar fibrous materials to a pressure of between 70 lbs. to 84 lbs. on the square inch of the boiler I can reduce considerably the proportion of alkali."

Others before him had called for "high pressure" boiling without limit, and certainly there is nothing in his patent to show that 140 *lbs. was necessary*. No one would learn that from his patent any more than from Montgolfier's, and no one could infer from Mellier's patent that a pressure of at least 100 lbs. must be used, and that without that, the manufacture must be commercially a failure.

The question is not whether Mellier's patent is limited to 84 lbs. as the *maximum* (there was no maximum limit in either Mongolfier's or Wright's patent). It is very evident that the *supposed* discovery spoken of by the anonymous writer in the Annual of Scientific Discovery for the year 1863, was not indicated in Mellier's patent of ten years prior date.

The supposed solution of the problem, according to this writer (who is of no authority) was found "within the last year"—not ten years before—which is the date of Mellier's patent. The truth is, that but for the paper famine the process referred to would not have been a *profitable* one.

THE QUESTIONS PRESENTED IN THIS CASE.

The questions presented by the pleadings and testimony upon the Mellier patent are chiefly as follows:

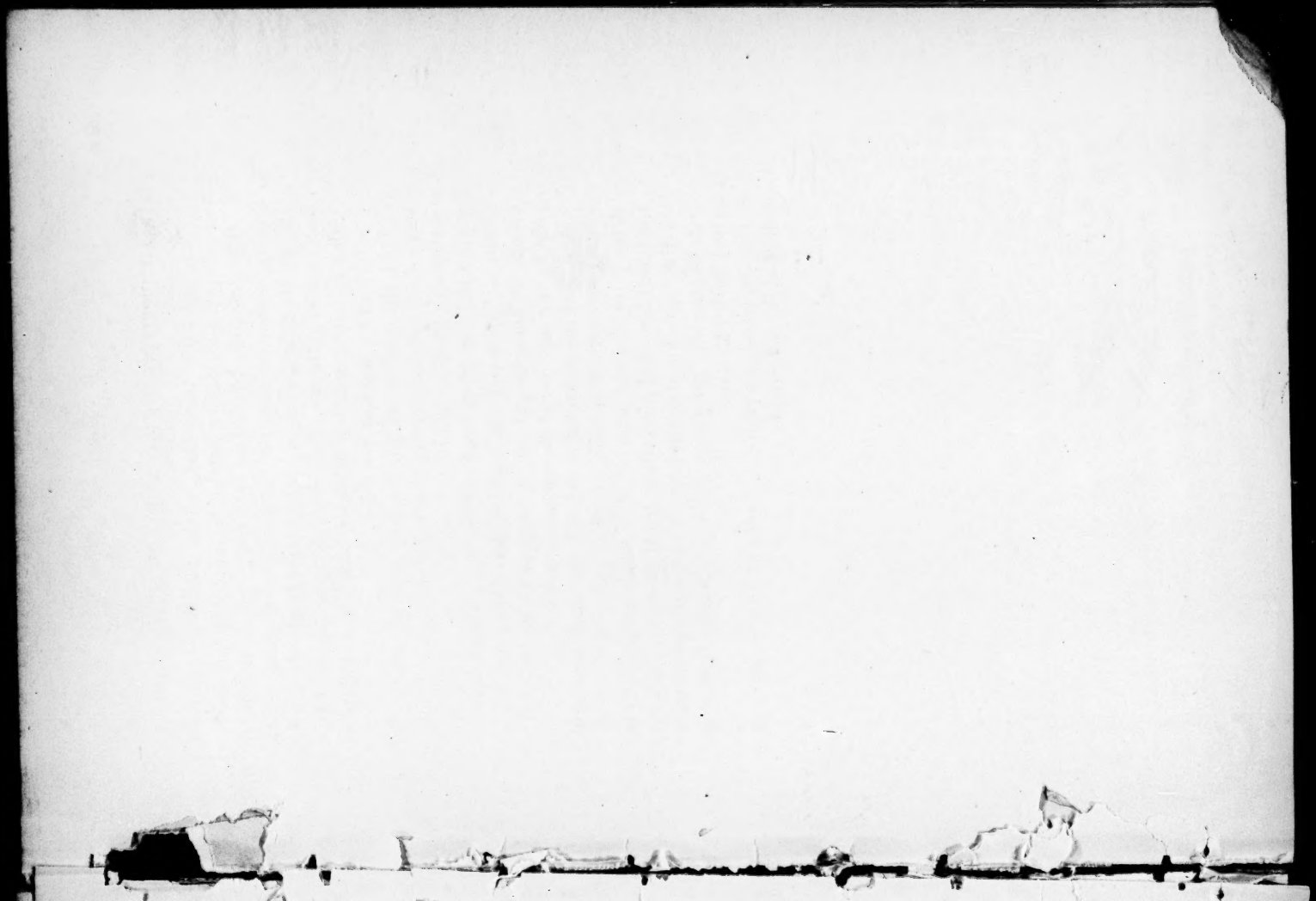
The defendants maintain that there was no novelty in high pressure boiling, nor in the use of pure caustic alkali; that the patent is merely for a single-stage process *combining* the use of a certain definite degree of heat with a specified quantity of alkali, and that, so regarded, it is invalid for want of invention.

That the patent is not for any and all degrees of steam pressure boiling, nor for indefinite quantities and qualities of alkaline solution.

That the patent is confined to the precise chemical treatment specified—as applied to straw; or, at all events, to materials which are reducible to bleachable pulp by the sole use of the means described.

And that the defendants did not use such materials, nor the strength or quality of alkali called for, nor the steam pressure, and instead of a single-stage chemical treatment like that prescribed by Mellier, they effected the disintegration of bamboo wood, by a series of chemical and mechanical processes entirely different from that called for by Mellier.

See the questions stated in detail in the "Points" on behalf of the defendants.



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Judge Davis

SUBSTANCE OF THE ARGUMENT

OF

R. W. RUSSELL,

ON BEHALF OF THE

FIBRE DISINTEGRATING COMPANY,

October 30th and 31st, 1873,

BEFORE THE

Supreme Court of the United States,

IN THE CASES OF

THE AMERICAN WOOD PAPER COMPANY,

Appellants,

vs.

THE FIBRE DISINTEGRATING COMPANY,

AND ON A CROSS APPEAL.

NEW YORK:

EVENING POST STEAM PRESSES, 41 NASSAU STREET, COR. LIBERTY.

1873.

THE AMERICAN WOOD PAPER CO.

vs.

THE FIBRE DISINTEGRATING CO.

Substance of the Argument of R. W. Russell on behalf of the Defendant in the Supreme Court.

The various questions presented in this case cannot be fully discussed within the time allowed for the argument; only the salient points can be presented, and, for an examination of the details, the court is respectfully referred to the printed brief on behalf of the defendants, which contains an abstract of all the important testimony on both sides—also abstracts of the most important of the patents which have been put in evidence, with explanatory notes and references, and also a full discussion of the various points in the case.

It will probably be found unnecessary to go into many of the details of those points. The case does not present any difficult or complicated questions of either law or fact; but should the court desire to examine critically any of the questions involved, it is hoped that the full and careful discussion of those questions in the defendants' brief will facilitate the inquiry.

The claim of a discovery of a new kind of paper pulp made from wood will be first considered, and then the history of the art of reducing fibrous vegetable substances to paper pulp, as presented by the plaintiffs' counsel, will be reviewed.

The questions as to the validity of the Watt & Burgess patents will be examined, and the further question, whether, assuming them to be valid, there has been any infringement of them by the defendants.

With respect to Keen's boiler patents, the defendants maintain that they have not infringed those patents.

And as to the Mellier patent, which forms the subject of the cross appeal, the defendants contend that the patent is invalid, and that, even if it be valid to the full extent of its claims, the defendants have not infringed it.

The alleged discovery of a new product.

The plaintiffs' counsel rely chiefly, if not exclusively, upon the reissued Watt & Burgess patent for the product which he claims as a new product patentable without reference to the process by which the new product is produced. The novelty of the product is alleged to consist in the fact that it "is of the *exact length*, and possesses the precise qualities which fit it to be converted into paper at once. It is soft, *non-elastic*, porous, and mats or *felts* properly in the paper-making machine *without any previous mechanical treatment*" (Plaintiffs' Brief, p. 49). See also pages 8, 21 and 27, to the effect that the fibre obtained from wood by *the sole* action of caustic alkali intensified by heat, is of the peculiar character just described. "What is most remarkable, and in which the *novelty of the invention consists*, this substance is of the exact consistency, *length* and other dimensions required in a fibre for paper-making. Watt & Burgess were the first to *discover* this fact."

It is alleged that pulp obtained from wood by processes in which a boiling with caustic alkali under pressure forms only part of the means of reducing the wood to pulp is of a totally different character—that it is not of the exact length required, and that it requires mechanical action to be applied to it, before it will felt on the paper machine.

Plaintiffs' counsel says (Plaintiffs' Brief, p. 27): "If cellulose should be produced in fibres of such *length* and possessing such properties as those in which *it had previously been found and used in the* manufacture of paper, the experiments would only have been a new variety of paper stock."

The cellulose here referred to is what Judge Cadwallader referred to in the passage from his opinion quoted on page 9 of Plaintiffs' Brief. He says, before this date (*i. e.*, before 19th

August, 1853, the date of Watt & Burgess' English patent), and before any maturity of their previous experiments, a pulp fit for making paper had been obtained by others from such fibrous substances as *wood and straw*, through the use of different processes for the disintegration of the fibres. In every such case the process had been one of *successive stages*." "The process had never been such as to produce the pulp at one operation," as Watt and Burgess do. The judge considered the invention to consist in the reduction of the process to one stage. He did not recognize the claim of a discovery of a new product. Judge Grier rejected the claim *in toto*.

Plaintiffs' counsel, to support his theory as to the alleged peculiar character of wood pulp made by the sole chemical action of caustic alkali and heat, refers to the testimony of Dr. Rand (*Record, page* 92, *ques.* 12 *and* 15). But it will be found on reference to that testimony that it does not sustain the theory of plaintiffs' counsel. The witness merely says that the fibres of paper pulp made from wood, straw and other vegetable substances, to be available, should be "flexible, thoroughly detached from each other, pliable and capable of felting or matting." Of course, that must be so, or paper could not be made from the pulp.

He adds that the cellulose cannot be obtained without "chemical means," and that "no known mechanical means can *wholly* separate" the cellulose and intercellulose On cross-examination, he admits (Record, page 209, ques. 5, and page 218, ques. 83) that the wood pulp made by boiling with caustic alkali under a steam pressure of a hundred and sixty to a hundred and seventy pounds, and sometimes higher, with caustic alkali of a strength of about 12° B. (Record, pages 208, 209), "is taken from the boiler and washed, and then is taken to the beating engine—an ordinary rag-beating engine —as I understand—modified by having the points on the beating cylinder blunt instead of sharp." (Page 209, q. 5.)

It is there beaten. By that mechanical action the fibres are detached from each other. The pulp is then bleached—then washed, "and submitted to a *prolonged beating* in the rag engine." It is then made into paper in the usual way (Record, page 209, q. 5, Rand.)

The same witness says: "The use of the *rag engine* is *necessary* after the pulp is bleached before it can be made into paper." (Record, p. 218, q. 83, Rand.)

So, then, it is not true that the wood pulp made by the sole action of caustic alkali and heat differs from wood pulp made partly by that action and partly by mechanical means, or by the aid of other chemical action, so that the former can be made into paper "without any previous mechanical treatment."

But it is argued that the knives of the rag engine are blunted. So they are when any kind of straw-pulp is beaten up. Rags are cut up in the rag engine, the knives being sharp for that purpose, but straw and wood-pulp, Esparto pulp, &c., is not cut, but only beaten up.

As to the statement of plaintiff's counsel, that the fibres of the pulp as it comes out of the boiler are of the *exact length* required, there is no proof in this record of that alleged fact. The pulp, when properly beaten up, and not before, is of the desired length and pliability, and it is of no consequence to this question whether the beating up is before or after the pulp is bleached.

HISTORY OF THE ART.

The plaintiffs' counsel, in giving a history of the art of reducing wood, straw, &c., to paper pulp (Plaintiffs' Brief, p. 105) quotes from the reports of the juries of the International Exhibition of 1862, which refer to a work published by Matthias Koops in 1800, some sheets of which were printed on straw and *wood* paper.

Matthias Koops' Patent of 1802.

Koops obtained a patent in England, 17th February, 1802, a copy of which is in this record. (Record, p. 344.)

That book has been exhibited to this court, and it will serve to refute the erroneous assumption of Commissioner Mason in his opinion on granting the original patent of 1854 to Watt & Burgess. "Can it be possible," says Mr. Mason, "that a pine plank can be formed into a ream of paper without including a *patentable* discovery in the process by which that end is attained."

The answer is, that any one converting a pine plank into a ream of paper by the process patented by Koops more than seventy years ago, and by which he made the wood paper, forming part of the old book now before the court, could do so without making a patentable discovery.

The fact is that Mr. Mason was totally unaware of the patents of Mongolfier, Gros and others for the manufacture of paper from wood.

Reports of the Juries of the International Exhibition.

In the before mentioned extract from the Reports of the Juries of the International Exhibition of 1862, it is stated that "Lemuel W. Wright patented (December 14, 1843) a process of making white paper from straw by the use of alkalies and *high pressure steam.*"

After mentioning that Coupier & Mellier purchased Wright's French patent and introduced an improvement, the chief novelty of which was the use of highly concentrated caustic leys, it is stated that "The enormous expense for chemicals and the wear and tear of machinery consequent upon their use, prevented any large development of the straw paper trade till about 1855, when three patentees, Sullivan, Mellier and Jullien, almost simultaneously invented improvements."

That Sullivan used weak lye and *superheated* steam; that Mellier used weak lye and high steam pressure "by *means of tubes* containing steam of all least 90 to 100 lbs. pressure."

It is added, "All three processes continue successfully at work, some makers using one process, some another, as best suited to their several makers and localities."

Annual of Scientific Discovery for 1855.

In the brief of plaintiff's counsel a quotation is made from the "Annual of Scientific Discovery for 1855," page 100. The quotation is made for the purpose of showing that up to 1855 the conversion of straw into white paper had not been effected *profitably*.

"That it can be effected is no question, but that it can be effected profitably is yet to be demonstrated."

The writer shows where the real difficulty existed. He says that the silica investing the straw, together with much gum and coloring matter, must be removed by the action of a caustic alkali; and adds, "It is claimed that a large part of the alkali so expended may be removed by evaporating the residuary liquors and calcining the deposited matters. *Theoretically this can be done; practically, with economy, it cannot.*"

In that conclusion the writer erred. Soon after he had written that article the process which he refers to for recovering the alkali was successfully established. It is a leading feature in the patents taken out jointly by Coupier & Mellier which called for the use of strong alkaline solutions.

It is this process and the use of pure caustic alkali which have secured the success of the manufacture of white paper from straw and wood, not anything invented by Watt & Burgess, for they invented nothing. It is true that by Mr. Burgess' efforts the plaintiffs have succeeded in establishing their business, but that is a different thing from invention.

HIGH-PRESSURE BOILING.

To prove that high pressure boiling with caustic alkali was not new at the date of the original Watt & Burgess patent, the

defendants have put in evidence several early patents and publications, amongst others the French patent to Gros, dated March 20, 1847.

Gros Patent 1847.

Commenting upon that patent, the plaintiff's counsel says (Plaintiff's Brief, pages 38, 39, 40) that Gros used mechanical means in addition to chemical processes, and that "in his boiling he does *not reach the minimum* degree of heat prescribed by Watt & Burgess."

That statement is incorrect. The Watt & Burgess reissued patent for a process calls for a steam heat of "at, *near*, or above 300° F." (*Record, page* 15).

Burgess says that 290° would be "near 300° within the meaning of his patent" (*Record, page* 117, *ques.* 54, *Burgess*).

Rand says that the pressure named by Gros gives a temperature within 3° of 300°, with a caustic alkali solution of 5° B., and that with a stronger alkaline solution, viz., of 12° B., it would be within a degree of 300° (*Record, page* 214, *ques.* 49, *Rand*).

Mr. H. B. Renwick says that the Gros patents describe the boiling of wood and bark in solutions of caustic alkali under pressure. The strength of the caustic alkaline solution is given. Gros says the boiling should be at a pressure of from three to four atmospheres, and Watt & Burgess at a temperature at, near, or above 300°. A pressure of four atmospheres, commencing with a perfect vacuum, as zero, would give a temperature of from 293 to 294° F. in pure water, and 3 or 4° higher in the alkaline solution described by Gros' patent. "The temperature, therefore, which is described in Gros' patent, comes within the limit of temperature prescribed by Watt & Burgess" (*Record, page* 191, *ques.* 4, *H. B. Renwick; and see Record, page* 198, *ques.* 14, *E. S. Renwick*).

Dr. Rand professed to subject the process described by Gros to the test of an experiment (*Record, page* 208, *ques.* 63, *page* 218, *ques* 94, *Rand*).

See comments on this experiment, Defendants' points, p. 22, note to abstract of Gros' patent.

Rand boiled the woody part of the broom plant *without preparing it* in any way, whereas Gros prepared it by first crushing it, then boiling it in caustic lye under pressure, then crushed it under rollers *until it looked like oakum*, and it was this material, so prepared, which Gros finally boiled in caustic alkali under pressure. To make that process profitable today, it would only be necessary to restore the alkali.

The principle of the process of Gros is similar to that of the defendants. They first reduce the wood to a fibrous mass like oakum, wash out the acid and resinous matter, and then boil the material in a caustic alkaline solution under pressure, but the material being very thoroughly prepared beforehand, a weak alkaline solution and a light pressure are used.

Rand distinguishes the patent of Gros from that of Watt & Burgess because, although Gros used what Watt & Burgess' patent calls for, viz., a boiling in a caustic alkaline solution at a temperature near 300°, he (Gros) effected the disintegration partly by other means.

The defendants do the same, and yet it is claimed that the defendants, by doing so, infringe the Watt & Burgess patent—that the defendants must evidently be infringing that patent, because their process embraces that contained in the Watt & Burgess patent!

The defendants concede that one cannot use another's invention by merely blending it with something else. But when the alleged invention consists in effecting by one process what was formerly effected by two or more processes, it is unreasonable to say that these processes cannot be lawfully used, because they include the single-stage process; and yet the complaint in this case is founded upon that fallacy.

Why Wood and Straw Paper can now be made Profitably.

The plaintiffs are entitled to credit for their energy and enterprise in establishing their business. But business enterprise is a very different thing from invention.

When the process for restoring the alkali was brought to perfection the profitable manufacture of wood pulp was assured without any invention of Watt & Burgess, especially when rags became dear and soda-ash and bleaching powders became cheap.

The plaintiffs claim that their business has been successful, except at one time, when rags being extraordinarily cheap, they discontinued the manufacture of wood pulp and worked up rags instead. Other manufacturers of pulp from straw, &c., had for similar reasons been compelled to discontinue the manufacture.

Mongolfier's Patent, 1838.

The French patent to Messrs. Mongolfier, the great French paper-makers, dated Feb. 7, 1838 (Record, page 452) deserves attention. It is for pulping *wood* by a compound process, which includes a boiling of the wood in a caustic alkaline solution under high pressure; no limits are fixed to the pressure.

The wood after being macerated is boiled in an alkaline ley, at high pressure. Then the material is crushed with rollers, and is again boiled in a caustic alkaline solution under high pressure. It is then bleached.

The result is declared to be a "pulp resembling that of cotton, perfectly fitted for the manufacture of paper, and of a superior white color."

The Lombardy poplar is recommended as the best wood for the purpose.

The criticisms of Dr. Rand upon this patent are refuted in the defendants' points, page 13, note to abstract of Mongolfier's patent.

Mongolfier's process would be with the use of alkali saving apparatus, preferrable to that of Watt and Burgess.

Wright's English Patent, 14*th Dec.*, 1843.

This is a patent to Lemuel W. Wright, a native of New Hampshire, for making paper from straw, jute, &c.

The invention is stated by the patent to consist in, amongst other things, "The peculiar apparatus or machinery employed for the purpose of boiling the same (the straw) by *high pressure steam*."

Wright was examined as a witness by both parties, plaintiffs and defendants, as to his operations in England under this patent. From his testimony, it appears that he made about fifteen tons of straw paper per week, for many years (Record, p. 224, ques. 83) by his high pressure process, using from 40 to 50 lbs. pressure (Record, page 226 to 230, ques. 9, 11, 12, 27, 41, 45).

He knew the effect of increased heat upon alkaline solutions, being in the practice of using very high pressure for bleaching (Record, page 229, ques. 40).

But after trying a boiling of the straw under a steam pressure of about 80 lbs. (Record, p. 229, ques. 40; page 234, ques. 86), he came to the conclusion that a better paper could be made by having *two* boilings at 40 to 50 lbs. (Record, page 230, ques. 50, 51); interposing between those two boilings a mechanical action, viz., after the first boiling a beating of the material and a washing. In that way he prepared the material for the application of the caustic alkali on the second boiling, and as the acid, gummy and other worthless matters had been, to a large extent eliminated, the caustic alkali (which was an expensive material,) having but little acid to neutralize, became very efficient, and a smaller quantity sufficed to complete the disintegration than would be required if applied to crude straw. He found that better paper was made by the compound process.

The defendants' process is founded upon the same principle as that of Wright. Wright's apparatus was ingeniously contrived so that the successive operations of boiling, beating and washing were effected without handling the pulp; it was blown by a head of steam from the boiler to the washing apparatus.

Wright was celebrated for his high pressure boilers; he made them for parties in France, Ireland and Russia. The Emperor of Russia bought one of him in 1838 or 1839 (Record, page 230, question 49).

His manufacture of straw paper in England was considered

by the trade a decided success. The largest and best paper maker in England bought a license under his patent (Record, p. 231, q. 53).

He says (Record, page 235, q. 87): "I believe I am the first one that made first quality paper from straw, and I believe the paper trade understands it in that way, and I am called the father of straw paper making."

In 1850 or 1851, he made pulp for fine white paper at his mill, called Spring Mill, and superintended the manufacture of it into paper at a paper mill in Kent, within a week or two after the pulp was made. Samples of that paper (Defendant's Exhibit N, O, P,), were exhibited by Wright at the first exhibition of the works of industry of all nations in London, in the year 1857, and got a prize medal (Record, page 166, q. 9).

A sample is before the court. It is of good color and strength. Wright states how the pulp was made:

1. The straw was boiled with caustic alkali and milk of lime.

2. Blown up into a tub and drawn into a washing engine common rag engine—and washed; then crushed with rollers and washed again.

3. Boiled in caustic alkali (without any milk of lime) under pressure from forty to fifty pounds.

4. Washed and bleached in the usual way (Record, p. 236, q. 103).

The strength of the alkali used in the second boiling was 6° to 8° by the English hydrometer (Record, p. 233, q. 73).

In manufacturing brown straw paper, the second boiling was omitted (Record, p. 234, q. 79).

Wright explains what he meant by "high pressure steam in his patent." He says, "I meant any pressure that would be worked above atmospheric pressure. I had a great idea at that time of high pressure steam and caustic alkali for dissolving the coloring and gummy matters contained in fibrous materials" (Record, page 231, q. 55).

Wright obtained a patent in France for his process for making straw paper by high pressure boiling with caustic alkali, and for his apparatus. That patent he sold to Mellier who, sometime afterwards, in conjunction with John T. Coupier,

obtained a patent for a process in which the alkali was to be restored, and very strong alkali was to be used. They accordingly substituted low pressure and strong alkaline solutions, and a new kind of boiler, in lieu of Wright's process (see the Coupier & Mellier patents.)

Still later, Mellier not being able to get alkali restoring apparatus for small establishments, returned to Wright's high pressure boiling, but used an improved boiler.

The Coupier & Mellier Patents, 1851.

The patents of Coupier & Mellier, three patents, English, French and American—are in this record.

The French patent is dated May 17, 1851, (Record, page 474).

The English patent, August 23, 1852, (Record, page 371.)

The American patent, August 2d, 1853, ante-dated to the date of the French patent (Record, page 379.)

See the abstracts of these patents, Defendants' points, pages 23 to 26, with explanatory notes.

The French patent requires the *wood*, &c., to be boiled with a very strong solution of caustic alkali, 8 to 10° B., at 100 to 110° centigrade. (That is equal to 230° F.). By this boiling the resinous matters are completely dissolved and the silex is freed. The further disintegration is effected by the bleaching liquor, which bleaches at the same time.

The alkaline liquor in which the *wood*, &c., is boiled is evaporated until it is of a thick consistency, then mixed with charcoal, &c., and burnt and the ashes render up by lixiviation about all the alkali which has been used in the operation.

(The plaintiffs use this process and recover 90 to 95 per cent. of the alkali.)

The English and American patents are similar to the French patent, except that in the American patent an open tub is used instead of pressure boiling, and with that change there is introduced a contrivance in the boiling tub for forcing the alkaline liquor through the material whilst it is being boiled.

And the use of *pure caustic alkali* is prescribed, and it is

alleged that the failure to bleach the straw pulp satisfactorily has been in part owing to the presence of lime in the caustic alkaline solution.

Publication in 1852.

Next in order of date after the Coupier & Mellier French patent, we find in this record a printed publication dated 27th September, 1852, in which it is stated that in England in the manufacture of straw paper "the straw is once or more boiled in a strong lye under a pressure of from 6 to 8 atmospheres."

This is explained by the experts Mr. H. B. Renwick and Mr. E. S. Renwick (Record, page 191, question 6, and page 198; question 16) to mean a boiling in a caustic alkaline solution, with a temperature of about 320 to 343° F.

Any one using a pulping boiler with 40 or 50 lbs. pressure, and learning from this publication that others used a higher pressure would, in order to avail himself of that information, merely have to set the safety valve to blow off at the higher instead of the lower pressure.

The information is complete; nothing could be added to it, No one could go to the Patent Office and get a patent merely for the difference between the 40 and 50 lbs. pressure, and that stated in the publication referred to as being in use in England.

Here a reference may be made to the proceedings in the Patent Office on the application by Mellier for a patent in the year 1857. The examiner states (Record page 261) that no patent could be allowed for "any degree of heat or pressure of boiler," and he mentions the fact that more than twenty applications had within a few years previously been made for patents for treating fibre with alkali of various strengths and in various ways, and that five-sixths of all of them had been permanently refused and most of them withdrawn.

High Pressure Boiling in the United States in 1852.

It is in proof in this case that in the year 1852 the Spofford

Rotary pulping boiler was in use to reduce hemp shives, cotton seeds, &c., to pulp for white paper, a pressure of 60lbs. to the inch as shown by the gauge; the boiling being in a solution of caustic alkali (Record, p. 143, q. 7 to 16, p. 176, q. 10, Howland).

The shives and seeds thus treated were bleached with the bleaching powders (Record, p. 144, q. 16, Howland).

The advantages of the high pressure were known. They considered 60lbs. better than 50lbs. pressure at that time (Record, p. 180, q. 69, Howland.)

The Spofford boiler referred to was patented in 1840 (Record, p. 386). The patent sets forth the advantages of the rotary motion of the boiler particularly "when the more *refractory* materials used in the manufacture of paper," "such, for example, as *straw* and cotton waste," are treated "*as the knotty portions of the straw*, and the greasy portions of the cotton waste were penetrated with difficulty by the digesting liquid. aided by the slight agitation produced by the boiler alone." (p. 388.)

But by the turning of the boiler an agitation is created which intermingles the straw and the digesting liquid with the charge, "the above-mentioned *refractory* materials are penetrated thoroughly, and acted upon by the digesting liquid and the heat" (Record, p. 388).

The Watt & Burgess English Patent.—19th *August*, 1853.

Next in order of date we find the Watt & Burgess English patent of 19th August, 1853, that being the date of the provisional specification. Watt & Burgess' American patent of 18th February, 1854, is antedated to that date.

The provisional specification is for a process whereby the wood chips or shavings or saw-dust are treated as follows:

1. Boiled in water.
2. Then treated with sulphurous acid.
3. Then treated with chlorine until the fibres are disintegrated. (Chlorine is the ordinary bleaching agent.)

4. Then a WARM and DILUTE solution of *caustic soda* or potash is applied.

Compared with Reissue of 1863.

This process is metamorphosed by the reissued patents of 7th April, 1863, into a process for "treating wood or other vegetable substance by boiling in an alkali under pressure," and the specification states that "By the words under pressure is meant a pressure at, near, or above 300° F." And such pressure is stated to be essential.

The reissued patent thus reissued in 1863, is made to represent that Watt & Burgess invented that process as far back as 19th August, 1853, which raises the legal presumption that they did so, and renders useless proof of other inventions during the intervening ten years.

Compared with the Final Specification.

The final specification filed by Watt & Burgess in the Great Seal Patent Office in England, 18th February, 1854, is not for the sulphurous acid and chlorine process, but is as follows :

1. The wood to be reduced to shavings or cuttings. (The boiling in water omitted.)
2. Boiled in a solution of caustic alkali—the strength of which is dependent upon the vegetable substance operated upon.

"We find boiling in a solution of caustic alkali under pressure of considerable service. *We do not claim this operation as a part of our invention.*"

3. The alkali to be restored.
4. Bleaching agent to be applied.
5. Placed in a *dilute* solution of caustic alkali.
6. Washed and bleached.

It thus appears that between 19th August, 1853, and 18th February, 1854, Watts & Burgess entirely changed their proposed process, but probably not being willing to lose

the fees paid on the provisional specification, or desiring to date back their claim of invention to 19th August, 1853, to cut out other inventors, they filed the final specification in question.

The English patent was void because the final specification did not correspond with the provisional specification. English cases on this subject are referred to in Defendants' points, p. 48, note.

See the remarks of Chief Justice Taney on the difference between the English and American patent systems in this respect, *Morse* v. *O'Reilly*, 15 How., on page 108.

In England the patent precedes the complete specification, while in the United States they go together.

The provisional specification compared with the Patent of 1854.

The American patent of 18th February, 1854, antedated not to the date of the final specification of the English patent, but to the date of the provisional specification, is similar to the final specification of the English patent.

The Patent of 1854 *compared with the reissues of* 1863.

The difference between it and the reissued patents of 1863 is pointed out by the experts H. B. Renwick (*Record, page* 190, E. S. Renwick, *Record, page* 195, and Professor Rogers, *Record, page* 328.)

Thus Professor Rogers says:

"In the patent of 1854, the process of paper pulp making as distinguished from bleaching, consists of three *successive* steps in especial *alternation* with each other as essential," and "in which operations pressure is in nowise essential as a feature." In the reissue of 1863, the process "consists of a single step, in which the use of high pressure is made of essential importance."

"The three-step process exhibiting this specific alternation in the use of the materials designated in the first named patent, namely of 1854, *would not at all lead to or suggest* the single-step process of the patent of 1863; but, on the contrary, *would suggest to a chemical expert* that nothing other than the three-step alternating process of the patent of 1854 would accomplish the result of producing pulp from wood, and therefore I regard the two as distinct inventions."

That was proper testimony for a chemical expert to give. The plaintiffs could find no competent expert to contradict it.

Mr. H. B. Renwick says (*Record, p.* 190, *ques.* 2) :

"There was no statement in the original patent that boiling under pressure, or under such great pressure is essential, nor that any boiling in alkali would reduce shavings to pulp. That discovery is not even hinted at in the original patent, in which original, on the contrary, it is stated that the shavings, after being boiled, are still shavings, and are only reduced to pulp by a subsequent treatment both with chlorine and a weak caustic alkali.

See this more fully presented by Mr. E. S. Renwick (*Record, pp.* 195 *to* 197) :

On the application for the patent of 1854, the objections of the examiner, to the effect that there was nothing new in the process, were met as follows :

"It is admitted that alkali and chlorine have been used in pulping vegetable matter, but it is not known that alkali, chlorine, oxygen and alkali have been used in the manner and in the order in which Messrs. Watt & Burgess use them.

"This *order and series* of processes is what, therefore, *constitutes their invention*" (*Record, page* 393).

The theory of plaintiffs' counsel is that a reissue may be had, not merely to correct errors and defects in the specification of the invention, but may also be obtained to add improvements discovered subsequent to the date of the original patent. And that allthough the reissued patents must be for *the same invention* as that originally patented, it is only necessary that the two patents should relate to the same subject matter.

That is a *question of law* upon which, of course, experts could not be examined. But experts can properly give evidence on the question of fact whether the process stated in the first patent would suggest to a chemical expert the process stated in the reissued patent. The defendants maintain that the invention patented in the reissue must be shown or suggested in the original specification.

In the defendants' points there is a carefully prepared digest of the cases on this question (*Point* 4, *pages* 52 *to* 63).

The decisions upon the reissues in the India rubber cases have no application to this case. In the original India rubber patent a great discovery was specified, and in the reissues the description of this discovery was amended. On the other hand, in the original Watt & Burgess patent no new discovery is presented, and the reissues are merely for the purpose of interpolaing alleged inventions and discoveries not embraced in the original patent, but said to have been in the minds of the patentees.

Watt & Burgess never claimed to have invented what their assignees claim as the invention of Watt & Burgess. On the contrary, when the patentees spoke for themselves, they declared that they did not claim the operation of boiling in a solution of caustic alkali under pressure as a part of their invention (*Record p.* 331). Now their assignees say that it was a part of the invention of the patentees—the *principal part*, if not the *whole* of the invention.

Neither Watt & Burgess nor anybody else, upon the application for the original patent or for the reissues, has made the oath of invention required by the Act of 1836, sec. 6, so as to cover the claim embraced in the reissues. A reissue should never be granted for anything not covered by the oath required by the Statute.

The ignorance of Burgess on the subject of high pressure boiling, is shown upon his cross-examination, in which he admits that when he got his patent in 1854, he did not know that anybody had pulped vegetable substances "by boiling in alkaline solutions at a high pressure" (*Record*, *p.* 129, *ques.* 144). He claims that his reissued patent gave him a *monopoly* of the use of high pressure boiling with a solution of caustic alkali at a temperature, at near or above 300°, because in his original patent he *referred* to boiling under pressure, and did not limit himself to the amount of pressure to be used (*Record*, *p.* 127, *q.* 132, *Burgess*).

He considers that such *reference* to pressure, not only entitled him to use pressure to any extent that he desired, but also entitled him to prevent any one else from using steam pressure in

the pulping process. And this claim is still persisted in, notwithstanding the establishment of the fact beyond contradiction, that prior patentees not only "referred" to steam pressure boiling, but called for *high* pressure—some of them specifying high degrees, and others calling for high pressure without limit!

Pure Caustic Alkali

It is now claimed also by plaintiffs' counsel that Watt & Burgess discovered the improvement in the use of pure caustic alkali, free from the presence of lime, at the same time that Coupier & Mellier discovered such improvement.

Neither the original English patent of Watt & Burgess, nor their American patent of 1854, nor their reissue of 1858, nor their reissues of 1863, make any mention of such a discovery. There is no evidence that Watt & Burgess discovered that improvement, or that they ever claimed to have discovered it. Their patents do *not even mention pure* caustic alkali.

The Mellier Patent 26th May, 1857, antedated to 7th August, 1854.

Is for a pulping boiler of a particular form, and for a process for making bleachable pulp from straw, by boiling it in a solution of pure caustic soda, from 2° to 3° B., at a temperature *not less* than 310° F, and with a steam pressure of "*at least* 70 lbs. on the square inch" (*Record, page* 19, *folio* 35).

This patent has expired. It was extended, but the extension has been held to be void.

The Watt & Burgess patent has some years to run, having been extended. It covers, as reissued, all boilings of all vegetable substances in any solutions of caustic alkali of any kind, quality or degree, at any pressure or temperature "at, *near*, or above 300° F.," up to 500° F. Consequently there is no novelty in any of the particular, specified in the Mellier patent respecting pressure or temperature.

And there is no novelty in the use of pure caustic soda—that being prescribed by the expired Coupier & Mellier patent

dated August 2d, 1853, antedated to 7th May, 1851 (*Record, page* 378).

As to the prescription of a strength of alkaline solution of 2° to 3° B., for straw, see Defendant's points, p. 94.

LEGAL OBJECTIONS TO THE WATT & BURGESS PATENTS.

1. The patents are void for want of novelty. There was no novelty in pressure boiling with a caustic alkaline solution. That is shown by the patents of Mongolfier, Gros and Wright, and by the printed publication in 1852; also by the testimony showing that 60 lbs pressure by the gauge was used in this country.

Watt & Burgess would not have been entitled to a patent even if they had been the first to carry the pressure higher than it had been carried before. (See this question discussed, Dfts.' Points, p. 90 to 93).

It is not pretended that they discovered that any special effect was produced by the use of a temperature "near" 300° which would not be produced by a lower temperature, say 250° (Record, p. 213, q. 38, Rand).

But Burgess proves the contrary. He says he discovered that a much greater heat was necessary for the reduction of woods to pulp, *i. e.*, 336° to 372° (Record, p. 244, q. 106, Burgess).

Even if Watt & Burgess had observed a special effect to be produced by the use of a temperature "near" 300°, they could not claim that there was a novelty in such use, for Gros called for such a temperature, and, as before observed, a higher temperature had been used with the Spofford Boiler in the U. S.

2. The patents are void because they are antedated to the date of the English provisional specification upon the al-

legation that the invention therein mentioned is the same invention as that patented in such reissues, which allegation is false (Defts.' Points, p. 47).

We need not stop to consider whether this objection could be cured by a reissue.

3. The original patent of 1854, is void for concealment of the alleged invention interpolated into the reissues (Defts.' Points, p. 50).

4. The reissues are void for concealing the fact that a definite temperature was found to be necessary for the reduction of woods to pulp (Defts. Points, p. 66).'

5. The reissued patents are also invalid because they were not reissued on the ground that the original patent was "inoperative or invalid," but merely because the original patent was alleged to be in the opinion of the assignees "not fully valid and available to them," that is, not *fully* "*available.*"

A patent cannot be reissued merely because it is not as available as it might be made by additions and alterations.

In Whiteley *vs.* Swayne, 4 Fisher, 124, it was held that the Commissioner was not authorized to grant a reissue upon such an application (Defts'. Points, p. 51).

6. The reissued patents are also shown to be void because they are not for the same invention as that covered by the original American patent of 1854 (Defts'. Points, p. 52).

7. That Watt & Burgess had not up to the 19th of August, 1853, invented what is patented by the reissues is manifest (Defts'. Points, p. 73).

No Infringement in any event.

And it is clear that even if the reissued patents were fully valid, they have not been infringed by the defendants by the use of their compound process (Defts'. Points, p. 74).

For the particulars of the defendants' process see defend-

ants' points, p. 131 to 133, point 25, also page 123, and defendants' answer, Record, page 63. The defendants' process is shown to be more economical than that of plaintiffs' (Record, p. 162, q. 181 to 183, Townsend).

The steam-blown material was *always* either boiled in an open tub and washed, or beaten up in a rag-engine and washed at the same time (Record, p. 71 q. 4 p. 147, q. 3). This was before the boiling in a close boiler with caustic alkali.

Burgess admits that the paper pulp thus prepared for the caustic alkali treatment is not a vegetable substance within the meaning of his patent (Record, p. 123, q. 109, Burgess). And Rand admits that the pulp made by the preparatory process of the defendants could be made into brown paper (Record, p. 93, q. 17, Rand).

The case for the plaintiffs is made to rest wholly upon the product patent and upon the incomprehensible proposition that Watt & Burgess manufacture a new product—a new kind of paper pulp by a peculiar chemical process, consisting of a single stage treatment with heat and caustic alkali (boiling woods, at a temperature of 366 to 372°, Record, p. 123, q. 106, which is 140 to 150 lbs. pressure, Record, page 118, q. 63), and therefore nobody shall be permitted to make a dissimilar product by a different process—shall not be permitted to effect a partial disintegration by boiling wood, &c., at a temperature "near" 300°, although the product has not the peculiar characteristics claimed for that produced by heat and alkali alone, and although the boiling of fibrous vegetable substances with caustic alkaline solutions under pressure, and even with a temperature near 300°, to reduce them to paper pulp, is old!

The proposition has not basis enough to be even debatable.

THE BOILER PATENTS.

With respect to the patent double-stirrers, described in Keen's Patent of 1859, (Record, p. 40) it is not stated in the patent that the stirring of pulp is a new thing—the claim o novelty is in the peculiar form of arrangement of the stirrers in combination with an expansion chamber, and a discharge of the pulp from the boiler by blowing it out.

The defendants used a single stirrer which, not having the advantage of the arrangement of Keen's patent stirrers, was found to be in the way, and was accordingly discontinued.

Keens' second patent of 1863, is for a perforated diaphragm, having a perforated well or cylinder, by means of which the boiler can be charged through a man or feed-hole at the top of the boiler, and the material does not fall upon or clog the perforated diaphragm.

The defendants do not use that contrivance but charge the boiler through a feed-hole below the diaphragm.

A boiler can be filled quicker by charging it through the top.

The mode of discharging the boiler is the same as that used by Lemuel W. Wright, described in his patent of 1843, and in fact the defendants' boilers were made originally for Wright (Record, page 166, q. 12-13).

The only mechanical experts who have been examined say that Keen's boiler patents are not infringed by the defendants.

Dr. Rand, who gave it as his opinion that the defendants infringed Keen's boiler patent by blowing out the contents of their boiler, is not an expert in mechanics, as will be seen on referring to his answer to cross-question 70, Record, p. 216, in which he refers the question to be answered by "an expert in mechanics."

The Watt & Burgess reissued patents describe (without claiming it as their invention) the same mode of discharging the boiler as that mentioned in Keen's patents.

The questions as to the boiler patents are fully discussed in Defendants' Points, 75 to 81.

THE MELLIER PATENT.

A single point will suffice upon the appeal against the decree upon this patent.

The bill of complaint in this case alleges that Watt & Burgess were the inventors of the procees of high pressure boiling with a caustic alkaline solution to reduce vegetable fibrous subtances to paper pulp.

In the courts below the theory has been advanced by the plaintiffs' counsel that it does not signify which of the patents sued on is valid, as the plaintiffs own them all.

It evidently does signify a great deal which of these patents take precedence; for if the Watt & Burgess are to take precedence (as they must), the question as to the validity of the Mellier patent is disposed of at once and it will of course be held that the appeal of the defendants against that part of the decree which relates to the Mellier patent should be allowed and the decree reversed.

Mellier's patent was obtained in the United States 26 May, 1857, antedated to 7 August, 1854.

Watt & Burgess patent was obtained in the United States, about three years before Mellier's viz., 18 Feb., 1854, antedated to 19 August, 1853.

It has been stated in argument by plaintiffs, counsel that it would take five years to settle the question of priority between those parties. But it is evident that so far as the present case is concerned no question about the priority can be raised; it is disposed of by what appears on the record. The plaintiffs cannot treat as a nullity the allegation in the bill that Watt & Burgess were the original and first inventors of the process described in their patent. Besides they have *proved* that allegation so far as the rival claims of Mellier are concerned by putting in evidence the Watt & Burgess patents in this case.

A different question might have been presented if separate suits had been brought upon the conflicting patents in question.

The plaintiffs counsel repeatedly speaks of the operations as being carried on under the several patents "conjointly." He appears to think that he can make an *olla podrida* of all of them.

The defendants maintain, on the contrary, that the questions

as to the validity of each patent must depend upon its own merits; that they cannot be blended together and the claims of the plaintiffs shifted from one to the other of them.

It is to be presumed that on the application for the reissues of the Watt & Burgess patents, *proof* was introduced that Watt & Burgess actually made the invention in 1853 for which the reissue is granted.

If this court should hold that the reissues are invalid, there is nothing to hinder an application now to the Patent Office for another patent to Watt & Burgess for the invention claimed by them. And upon that application, an interference with the Mellier patent could be declared. The delay in applying for the patent can be explained, and it can be shown that there was no abandonment.

It does not follow that the Mellier patent is to be set up and sustained if the Watt & Burgess patent is, for any reason, declared to be invalid, whether the objection to its validity be curable or not.

If, for example, the Watt & Burgess patent be declared invalid, as being *too broad*, because the *minimum* temperature of the boiling solution of caustic alkali which it calls for is no higher than that called for by Gros' patent, it will not follow that the Mellier patent could be brought forward and sustained. It is here to be observed that the Watt & Burgess patent embraces all temperatures up to 500°; all degrees of strength, and all qualities of caustic alkaline solutions, and all vegetable fibrous materials.

Some of the judges of the Circuit Courts before whom cases upon the Mellier patent have been heard, proceeding upon the assumption that Mellier had made a great invention, felt disposed to put a very *liberal*, even *latitudinarian* construction upon his patent, so as to embrace all operations in which high-pressure boiling should be used. The defendants in this case maintain that such construction is erroneous, and in opposition to the opinion of Judge Hall.

Judge Hall put a construction upon the patent defining its limits, which construction, appears to be the proper one, and his

views were adopted by Judge Grier. Judge Woodruff erroneously supposed that he was following Judge Hall's opinion, when, in fact, he took an opposite view of the limits of the patent. The case, however, before Judge Woodruff was totally different from that now before this court.

When we see that Mellier was anticipated by Watt & Burgess (to say nothing of the question whether they were anticipated by Gros and others), all the reasons for expanding or stretching the Mellier patent fail, and it is reduced to a process in which the only novelty is the empirical prescription of a fixed, precise quantity of alkali to neutralize the acid of straw—as to which see Defendants' points, p. 94.

Extracts from Judge Hall's Opinion.

Judge Hall says (*Record p.* 27) :

"It is evident that the process thus claimed includes only the specified boiling of the material treated in the solution and under the conditions specified."

He says, after detailing the particulars: "Thus limiting the process to the boiling under the conditions thus indicated."

"The real discovery of Mellier, the main idea, the spirit or principle of his invention, was that the known effects of a solution of pure caustic soda, which had been *previously advantageously* used for boiling straw and other fibrous materials of similar character and texture in *open vessels* in which the heat could be raised only to 212° F., might, by the use of a much greater heat, *not less* than 310° F., be advantageously and greatly increased."

He compares this to Neilson's invention in the celebrated hot-blast case, as to which see Defendant's Points, page 91.

Record, p. 28. Speaking of the temperature of the boiling solution, Judge Hall says :

"The phrase '*not less than*' *fixes a minimum limit* without regard to a *maximum*."

"While *the minimum heat requisite to produce a really beneficial result was stated*, no upward limit was fixed."

"We are satisfied from the proof that boiling straw, in accordance with that process for the shortest time and *at the*

lowest pressure indicated in the specification, will produce a useful result—one better than that obtained at the same time and at the same cost by the use of the "open tub process."

Record, page 29. "There is certainly *some testimony*, though it is *not* of *the most conclusive* character, to show that rope and other refractory material had been boiled in rotaries at different pressures above 70 lbs. prior to the invention of Mellier; but the liquid used for such boiling was not a solution of pure caustic alkali, but contained lime in considerable quantity; and the extraordinary degree of heat used was *not regularly and uniformly* attained and kept up, but *was rather casual and incidental.*"

Record, p. 30. "Until the defendants in 1857 entered upon its use, the *open tub* process of Coupier & Mellier was still in general use."

Record, p. 32. Speaking of the patent obtained by Palser & Howland, the judge says that the Patent Office appeared to have come to the conclusion that the patent did not conflict with the claims of the Mellier patent.

"This conclusion was probably based upon the facts that the strength of solution in Mellier's was from 2° to 3° Baume, and its quantity about 70 gallons to the 100 pounds of stock, while that in the defendants' process was to be from 3½ to 3¾ Baume, and its quantity 60 gallons to the same quantity of stock; and that a higher degree of heat was never needed, differences which were probably considered sufficient to make two processes substantially different."

Record, p. 32. Judge Hall then shows that the defendants did use a solution of the strength called for by the Mellier patent.

"The proof shows that by the introduction and condensation of steam from another boiler, the alkaline solution in defendants' rotaryis increased about 20 per cent. in quantity, whilst its strength is consequently diminished until it is not beyond 3° B."

It is evident from Judge Hall's remarks that the Watt & Burgess patents were not before him nor either of the patents of Mongolfier, Gros and Wright, nor even the patent of Coupier & Mellier—the French patent—which calls for pressure boiling.

The Mellier Patent Invalid.

Looking at the Mellier patent by the light of the earlier patents, even leaving out the Watt & Burgess patents, it will be found that high pressure boiling was not patentable. See this question fully discussed in *Defendants' points*, p. 82 to 93.

There was no novelty in the use of pure caustic alkali. (*Defendants' points, p.* 94.)

The patent could not be sustained merely for the combination of the old elements, pressure boiling and pure caustic alkali, called for by previous patents. And there was no discovery of a chemical compound, a combination of heat and alkali, whereby we have the proper quantity of alkali necessary to unite with the acid in the straw, so that an excess of alkali would be waste (*Defendants' points, p.* 94 to 98).

No Infringement in any Event.

Even if the Mellier patent were valid, there is no infringement by the defendants.

1. The defendants do not use 70 lbs. pressure. The patent referring to 70 lbs. pressure as the minimum, and directing the operator to work by the gauge, does not mean $55\frac{3}{10}$ lbs. by the gauge but means 70 lbs. by the gauge (*Defendants' points, p.* 101 to 108).

2. If the patent does mean $55\frac{3}{10}$ths by the gauge, then it is open to an objection in addition to those above stated, viz., that it is proved that 60 lbs. gauge pressure was used in the United States prior to Mellier's patent (Defendant's Points, p. 121).

3. The patent is confined to straw. (This is now conceded). And the defendants did not, by their compound process make any bleachable pulp from straw (Defendants' Points, pp. 111–131).

4. If the patent extends to other materials besides straw, it

is only such materials as with the same treatment will yield a *bleachable* pulp. (This is now conceded). The bamboo treated by the defendants required and received a totally different treatment (Defendant's Points, p. 116, 138).

5. Mellier's patent is for a single-stage chemical process. *That constitutes the only alleged novelty.* It is not infringed by the chemical and mechanical process of the defendants (Defendants' Points, pp. 125 to 133).

6. The patent is confined, as to the alkaline solution to be used, to a solution of pure caustic soda of the strength of 2° to 3° B. (in combination with the prescribed steam pressure.)

It is not proved that the defendants used that strength of alkaline solution, nor that they used pure caustic soda (Defendants' Points, pp. 134 to 143, and pages 94 to 96).

Plaintiffs' counsel now resting on the Watt & Burgess patents, contends that plaintiffs used a very strong alkaline solution like that called for by the Watt & Burgess patents, viz., 8° B, not like that called for by the Mellier patent, viz., 2° to 3° B.

The court appears to be relieved from the examination of the above details as the Watt & Burgess patents are now made to take precedence (the Mellier patent has expired). The case for the plaintiffs rests upon the Watt & Burgess product patent. And now divested of unnecessary questions, the case presented by the plaintiffs is utterly destitute of foundation, and does not present even debatable matter.

The decree appealed from should, so far as it relates to the Watt & Burgess patents and Keen's boiler patents, be affirmed, and so far as it relates to the Mellier patent, it should be reversed, with costs.

Judge Lowell

IN THE

SUPREME COURT

OF THE UNITED STATES.

THE AMERICAN WOOD PAPER COMPANY,

Complainants and Appellants,

vs.

THE FIBRE DISINTEGRATING COMPANY,

Defendants and Appellees.

CLOSING ARGUMENT OF

THOMAS A. JENCKES,

For Complainants and Appellants.

NEW YORK:
EVENING POST STEAM PRESSES, 41 NASSAU STREET, CORNER LIBERTY.

1873.

IN THE

Supreme Court

OF THE UNITED STATES.

FRIDAY, October 31st, 1873.

THE AMERICAN WOOD PAPER CO.,
Complainants and Appellants,

vs.

THE FIBRE DISINTEGRATING CO.,
Defendants and Appellees.

No. 58.

Closing Argument of T. A. Jenckes.

If the court please; the learned counsel for the defendants has made so many points in the argument which he has presented, that I could but touch them cursorily within my limited time; and if I do not review them one by one, I trust that the court will not consider that I have avoided any for special reason, but that I believe the points upon which I rest this

case for the appellants to be decisive of the whole controversy.

I explained to your honors yesterday from the language of the patent, the averments in the bill, and the exhibits and testimony before the court, what our invention actually consisted in. I explained the controlling feature in the Watt & Burgess invention, and showed that it was the production of a fibre fit for immediate use in paper-making, directly from the wood, by chemical agencies alone at a single operation for certain kinds of wood, and a double one for others.

There is no difference between us as to the construction of the patent, or as to what may be the scope of our invention. The language used by the learned gentleman in his brief shows that he concedes our construction to be the correct one. But he says in the beginning of his remarks, "You do not state truly how you work your invention; if your invention be as you claim, you do not follow it; and because you do not follow it, we have the right to assert that your description is intended to mislead." And he reads from the testimony of our chemical expert, Dr. Rand, to show that another and additional process is used to work the pulp into white paper, after the step at which I stated to the court yesterday, and which the patent states, our invention ceases.

Now the gentleman is entirely mistaken as to the language and effect of that testimony. If I had stated it untruly, there would have been an improper construction of the patent, and a proper point to have made against us before your honors. But the language of the patent is, that after this pulp or product of the alkali boiling is washed in the vat, it can be made immediately into good brown paper; and that to make it into good white paper nothing remains but to have it bleached by the usual processes. I reaffirm that, in argument. Dr. Rand does not state anything to the contrary. I will read exactly what he does say. Part of what he said the gentleman has put upon a sup-

plementary brief which he has handed to your honors, but not the whole. I read from p. 209, Rand's general description of the process:

"The materials are kept under this pressure for five hours."

That is, in the boiling.

"The fires are then withdrawn, the discharge-valve at the bottom of the boiler opened, and the contents blown out into a suitable vessel. The blowing out requires from two to four minutes. The product is placed in cars with perforated bottoms, and washed with hot water. * * * The material, after washing, is taken to the beating engine—an ordinary rag-beating engine—as I understood, modified by having the points on the beating-cylinder blunt instead of sharp."

It was a *beating*—not a grinding, nor cutting engine.

"I don't know how long it was in the beating engine, but I was informed a short time. It was then pumped into a bleach-vat, and then submitted to the action of a bath of chloride of lime, containing 15 per cent. of the chloride to the dry pulp, or about 5 per cent. to the original amount of wood. The bleached pulp is now washed and submitted to a prolonged beating in the rag-engine. This prolonged beating is found to enable it to hold water, as it is termed, when passing over the wire of the paper-making machine. It is then made into paper by the usual process."

Then, he says, on p. 207:

"In your answer to cross-interrogatory five, you state that the pulp, after having been washed, is passed through a rag-engine. What is the object of this operation?

"A. It is to mix the pulp with water to such a consistence as to enable it to be pumped into a tank. *At Royer's Ford the rag-engine is not used, and the pulp is mixed by means of a wooden dasher.*"

There are two factories: the factory which he first speaks of is at Manayunk.

"The beating, after the bleaching, is to enable the fibres to felt. It is necessary in pulp of all kinds, whether made from wood, rags, or other material."

And again, at pp. 217 and 218:

"Q. 83. Do I understand you to intend to convey the impression, by your examination-in-chief to-day, that in working under the reissued patent of Ladd & Keen, of 1863, the use of a rag-engine would in no way aid or contribute materially to the production of the pulp?

"A. *I do so intend.* The use of the rag-engine is necessary after the pulp is bleached, before it can be made into paper."

Why? Here is the pulp as it is bleached, put into large vats 8, 10 or 12 feet square, and 10 feet deep, submitted to the action of chlorine, and shoveled out like snow, only it is more solid than snow, because that has no fibre. These are the samples (exhibiting them). They have been wet to show the consistency after bleaching.

And how are they made into paper? "By the ordinary operation," says Dr. Rand, which is necessary for pulp of all kinds, whether derived from rag, straw, wood or other material. That is, it must be mixed up with water, so that it shall be in a perfectly fluid condition, and can be pumped into a tank from which it is drawn into the Fourdrinier machine, in which the paper is made.

Your honors will find that explanation in either of the scientific works to which reference is made in my brief. There are several of them here, and of one, Hoffman's, shows drawings of all these machines, and illustrates to the eye what these witnesses speak of.

You will observe that Rand's attention is called to his testimony specially, and he says this final mixing has nothing to do with the production of pulp. I am somewhat suprised that the learned gentleman, who is an expert in the manufacture of paper as well as in the law, should have made or attempted to make this point. We stand upon the ground, and place our case there, that we are the first in the world to produce a pulp of the character described, by chemical agencies such as are described in the specification; and the gentlemen must rest his defense either by pointing us to some antecedent instance where such pulp has been produced, or by showing that he does not infringe this product. He halts between both courses, not taking either directly and squarely, but introduces certain prior patents, and pointing to portions of their provisions and descriptions, he argues that these, though

not precisely within our descriptions, ought to be held to be subtantially the same; and that such weight should be given to them as would invalidate these reissued patents, which stand upon this single ground. And chief among these is the patent of Gros. A great deal is said about the patent of Wright, but I do not understand from the gentleman's remarks, that it was pointed out that Watt & Burgess' patent, is affected by the patent of Wright, but only that of Mellier.

(Mr. Russell.) Both.

(Mr. Jenckes.) I say, "from the remarks." If you now say from both, I will accept the addition, although no expert has been examined by the defendants on this issue.

The patent of Gros was for an attempt to produce paper stock from the broom plant; I listened in vain for the gentleman to point out from any portion of Gros' description a passage which averred that a pure pulp, fit for the manufacture of paper, had been obtained by mechanical or chemical means, or both combined. But he says our expert undertook to discredit what Gros did, by taking a sample of broom plant and subjecting it to a purely chemical agency, and he did not get the result that Gros did, because he did not use all the means employed by Gros. But he fails to see that it was for the precise purpose of showing that the mechanical appliances were necessary that the experiment was made. Dr. Rand, who had made experiments for us, took the same apparatus that he had used for us, procured a sample of broom-plant, gave the experiment the benefit of using a larger per cent. of alkali; subjected the plant to the operation of this alkali and heat and pressure for the length of time mentioned in Gros' specification, and has failed to produce anything but a very imperfect result. Now, the gentleman says that he failed because he did not use the preliminary treatment. He admits, then, the character of the treat-

ment; that it was necessary, and that whatever Gros did obtain was only obtained by the combination of mechanical with chemical means.

Now let us see for a moment, by referring to the patent and specification itself, what it was that he obtained. Your honors have more light upon the subject now than when I addressed you yesterday. The material goes through the rolling, crushing, packing, washing, boiling, the laying aside of the mass for a considerable period, taking it up a again, and then after all these combined preliminary mechanical and chemical treatments, he says, "the wood freed from its bark, which has been laid aside after the operation of rolling, must be submitted to a wash in a closed vessel, with a pressure of *from* (about) three to four atmospheres." That is the only point in which this specification, or any specification of any patent previous to Watt & Burgess, or any description of anything back of Watt & Burgess' description of their chemical operation, which is produced to anticipate them. That is the only passage in which an amount of pressure or degree of temperature is indicated. If there had been any other it would have been pointed out to your honors.

This pressure of three or four atmospheres must be measured from a vacuum at zero, in accordance with the French tables, which refer to internal pressure alone, and would indicate upon the steam-gauge a pressure from 30 to 45 lbs. The pressure which Dr. Rand gave was 45 (*p.* 208, *int.* 63). Renwick agreed to this mode of measurement from zero (*p.* 198, *int.* 14).

The gentleman says it is not a correct translation. But it is a sworn translation (*Vogsnack, p.* 131, *int.* 34), and if we go back to the original, it leaves us still more in doubt, because the word which is translated as "from" or "about" is the word "*environ*" at the end of the sentence. This phrase concerning pressure was put forth as a mere suggestion for the purpose of indicating that heat which would create this pressure was better for the purpose of aiding in

softening the material acted upon. The gentleman criticised the word "washing." The original is "*lessive*," which means to bathe, for the purpose of washing and softening, and for that alone. The translator being in doubt, says, "washing" or "lye treatment," which is for an alkali bath. After it is taken out from this bath with this alkaline treatment, the alkaline solutions must be removed from the pulp either by percolation or pressure. After this, it must be submitted to a second bath, similar to the first, and then well washed. It must then be *ground* much finer than rags. It is put into a grinding engine and ground up as oakum would be. Then it is pressed out and submitted to the operation of *chlorine gas*, to be refined. After this operation, something else may be done, which is also necessary before we reach what is called the pulp.

The term is "chlorine gas."

The gentleman's chemistry is somewhat confused when he says this is a part of the process of bleaching. The operations of bleaching and that of subjecting substances to the action of chlorine gas, are entirely different. The learned gentleman, in his brief, refers to Dr. Ure's work, article "Bleaching," which explains the difference to a certain extent. The other works on paper-making here show the difference exactly. The testimony of both Burgess and Rand point to the special difference in paper-making. The article to be bleached is subjected to the action of what is known as "bleaching powders," made from chloride of lime which contains chlorine. These are dissolved in water. As soon as dissolved, the chlorine, having a stronger affinity for the hydrogen of the water than it has for anything that may be combined with it in the powder, decomposes the water and unites with the hydrogen and liberates the oxygen. Chemists, to this day, disagree as to whether the bleaching is effected by the chlorine, the hydrogen, or by the liberated oxygen. It is a disputed question,

and you will find in all these works upon chemistry as applied to the arts, the phrase "bleaching is performed in the presence of chlorine," instead of being effected, as formerly believed, by its direct action. The coloring matter is removed without decreasing the weight of the article bleached at all, unless the operation be continued to an unreasonable length.

But *chlorine gas* is altogether a different thing. When a substance is subjected to the action of chlorine gas, as the shavings were to be in the original specification of Watt & Burgess, or as the pulpy mass is required to be in the second operation in the reissued patent of Watt & Burgess, to remove the color from resinous woods, then the chlorine gas acts as an agent to combine with the intercellular matter and remove it. There is a combination and affinity between the two and a substance is formed called "humic acid." But these are as distinct operations as any in chemistry can be, and I was surprised to hear my learned friend confuse them.

Therefore Gros never got a pulp, and never described a pulp as the result of any one operation, either mechanical or chemical. If by any accident pulp like ours was formed in the course of his "lye treatment," he did not know it, for he proceeded to tear it and cut it up in his "grinding engine," which ground it "much finer than rags." The true fibre from wood needs no such grinding.

This case stands in this singular position. Here we have in our specification a clear description of a chemical action and chemical result. The effect of the caustic alkali is to remove the entire intercellular matter of wood, leaving the fibre as pure cellulose. Now, where so many inventors were trying to use chemicals to help out mechanical operations, it would be strange if some of them had not thought of using alkalies as well as acids, and of using heat to intensify the action of the alkali, and had not also thought of measuring the degree of this heat. It is remarkable that where so many

scientific men, as some of them were—Montgolfier and Gros, especially—were experimenting with this idea and hope in their minds, that they had not ascertained that a temperature of 300° and above, with the action of the alkali would remove this intercellular matter. It seems strange that by accident some one did not stumble upon that scientific fact.

(Clifford, J.): Is pressure a chemical agent?

(Mr. Jenckes): It is the consequence of heat; heat is the agent; pressure is simply the measure of heat; the pressure guage indicates pounds, which are translated into degrees.

(Clifford J.): Then you are right; it is clearly a chemical result.

(Mr. Jenckes): Pressure has nothing at all to do with the operation, except to enable the operator to obtain a higher degree of heat in a close vessel; in this respect it is somewhat similar to the inventions in India rubber, and strikingly similar to the inventions of distillation; and in an opposite direction similar to the parafine oil case, the subject of the decision of Vice-Chancellor Stuart, where an extraordinary degree of cold was required to produce the oil. The only mechanical use of pressure is to discharge the pulp from the boiler after the chemical operation is completed. It is somewhat strange, I say, after going through all this mass of recorded experiments upon the subject, that some one had not by accident hit upon the discovery of the proper degree of heat. If he had the result would doubtless have been published. Still, it would not have anticipated Watt & Burgess, unless the experimenter had perceived that he had made the discovery; and had become aware that he had produced pulp which might be applied to immediate use in the manufacture of paper.

Professor Faraday said that he had undoubtedly formed vulcanized rubber in his experiments upon India rubber long before Hancock or Goodyear, because he

had mixed rubber, sulphur and lead, and subjected the compound to a high degree of heat, but he did not become aware that there was anything new or valuable in the result. He said some of his old specimens reminded him of vulcanized rubber, but he never claimed to be the inventor of it; he placed no value upon his specimens; they were mere accidental results. And so almost every chemist making experiments at random, has produced results which were of no value to him; he did not perceive that there was any value in them; but others have, and, as in the paraffine oil case, have made valuable contributions to the useful arts based on such experiments.

I will take up no more time in considering Gros. He simply worked in chemical operations, but never produced pulp. He says he did not, and all we know about it is from what he has said in his specification. He never produced pulp by any chemical action alone, and none such ever appeared from any of his experiments, or from the works of any manufacturer claiming under him. So far as appears, his experiments were a total failure.

The Montgolfiers are cited here in the same manner as Wright. They, as I understand, are referred to in opposition to the Watt & Burgess patent, because they say that they used *high pressure* (*pp.* 452, 3, *near bottom*). I will admit that they did both use high steam. But what of that? They do not produce any result. Ours is not an invention for the use of high steam.

I explained to your honors yesterday that the real discovery here is the product, and that was made before the discovery of the process. They argue upon the other side—and that has been the cause of the mistake in the court below—and say that the process patent is the only one of value, on the contrary the whole value is in the product. The attempt here is to destroy our process patent by finding in it similarities with the older processes referred to, and the product patent by the argument that like processes must produce like results. But no result is referred to as having anticipated the product patent

(*Renwick, E. S., p.* 200. *x ints.* 13, 14). And it is clearly proved in this case, as in the case in the Third Circuit, that Watt & Burgess discovered this pulp before they discovered any process for obtaining it which could be described with the precision required in a specification.

Judge Cadwallader expressly finds this fact. He says they discovered pulp in 1852, in their experiments with the closed iron vessel.

One of the chief points in his adverse opinion is, that they had not discovered a process which could be described sufficiently until after the date of their original patent, and which new discovery, as he says, could not be made use of in a reissue.

The use of high steam is but an element, as the use of the boiler is but an element. It is an element, not of the invention of the product, but an element in the process patent—something that helps you realize the production, but nothing which lead one to anticipate the product. If they had all these elements for the purposes of experiment, caustic alkali, high steam, knowledge of the effects of heat, boilers used for high pressure, rags, straw, and other raw material well known (wood was not)—all these things were old and well known; still, I say that there is no chemist in the world who could, by a process of *a priori* reasoning, have come to the conclusion that the fibre of wood was pure cellulose, and could be extracted by these means from the wood in a condition fit for the manufacture of paper. There was no prescience in mankind to anticipate that discovery. It could be only the result of experiment, and an empirical experiment at that, and yet be an invention. No one could have foreseen that caustic alkali of a certain strength and at a certain temperature would have removed from the wood all the substances that were harmful, and leave that which was useful for paper-making, in the precise form in which it was needed for such use.

I may perhaps better illustrate this branch of the

subject by showing what the defendants actually use. The learned gentleman says that they do not choose to use our process, which is a single operation, the Mellier process being confined, as he says, to straw and similar materials, to a certain low degree of alkali, and certain limitations of heat; the Watt & Burgess being broader. But they use a compound process, and from the fact that it is compound, it is similar to Gros, Wright, Montgolfier and others, and is more nearly allied to those processes than to ours. I will read a description which the gentleman has given of their process, from the answer, and consider that, for the purpose of this hearing, as better than the description given by the witnesses. On page 63 I read:

"The said defendants, further answering, say that they have, since the fall of 1864, made paper pulp at their works, at South Brooklyn, from bamboo and other vegetable fibres, but almost exclusively from bamboo, and have had the same made into paper, and have sold the same, or part thereof, but not yet in sufficient quantities to yield any profit. And that the process by which the said paper pulp has been made is substantially as follows:

"The bamboo, in lengths of about five feet, split lengthwise into two or three pieces, is put into a steam cylinder, called a gun, and after being therein subjected to a steam-pressure of about 170 pounds, is projected from such cylinder into the atmosphere by the force of the steam in such cylinder. The fibres of the bamboo are thus disintegrated."

The gentleman says that is partly chemical and partly mechanical. We need not have any controversy about that. It is the mechanical result which is of advantage in the process which follows. He says:

"The principal part of the gum, silex and other useless matters, can be washed out by the application of water."

Upon this point the testimony of Townsend, superintendent, is, that the final result of pulp is about 30 per cent. in weight of the bamboo, and that 40 per cent. is expelled by the action of the steam-gun, and the remaining 30 per cent. by the subsequent chemical action. (On page 149 those results are given.) We have here a sample of fibre as blown from the steam-gun. (*Defendant's Exhibit K.*) It looks very much like old rope, oakum, a long tough fibre.

"The steam-blown bamboo is then put into a paper-maker's beating

engine, and there for a short time beaten and washed. It is now pulp, fit for coarse paper."

No sample is produced of paper of any kind made from this coarse material.

"Caustic alkali is then put to the pulp, and it is boiled under a pressure of about 20 to 45 pounds, being a heat of about 234 to 275 degrees, Fahrenheit's scale. A lower pressure will answer very well, but a little advantage may be gained by the higher pressure. And these defendants claim the right to boil said pulp under any pressure."

The evidence of the superintendents, McCracken and Townsend, shows that the pressure actually used was from 40 to 60 pounds, indicating a temperature from 290° to 316°. (*McCracken, p.* 71, *Int.* 4; *p.* 74, *Int.* 32; *Townsend, p.* 156, *Ints.* 101–3; *p.* 158, 140–5).

About this fact there is now no dispute. They used to blow off from the safety-valve at 60 pounds. The safety-valve, as they say, generally did blow off during the course of the boiling. They could have a low heat —it may be 40 pounds one minute, and 60 pounds very shortly afterwards. It would run up to the extreme very quickly. But there is no question about the fact that it did run up as high as sixty pounds.

"In some cases the pulp, after being boiled as aforesaid, is more thoroughly disintegrated by being subjected to the blowing process a second time; that is to say, the contents of the boiler are blown directly, and with great force, into a tank by the pressure of steam in the boiler."

They do that as we do.

"But in some cases the defendants use a Spofford rotary boiler, and this last-mentioned blowing process is then omitted. Nor is it absolutely essential, after blowing from the guns and the preliminary pulping process before referred to."

The Spofford rotary boiler was not often used, because the pulp came out "all knotted up." (*Townsend, p.* 160, *Int.* 169.)

"The pulp, after being boiled, is washed and made into paper in the usual way; being bleached in the usual way when white paper is required."

We have samples of the product. Here is *Exhibit* "*F*," brown paper made directly from the pulp. Now what we complain of is that chemical operation. They may make as long as they choose this coarse fibre like oakum with the steam-gum, and we shall never trouble them.

(Clifford J.) But you say they are liable if they use your process for any portion.

(Mr. Jenckes.) That is, if they make pulp by it. They must make a pulp fit to be bleached and made directly into white paper. Your honors understand that we have no controversy about coarse brown paper, or wrapping paper. All that field is outside of ours. They do not infringe upon us unless they make a pulp from their boilers that can be bleached and run directly into white paper. These defendants may stop at their gun process, and we shall never trouble them. But they take this material looking like oakum, somewhat hard, put it into their boilers and bring out the material which I hold in my hand (*Exhibit L*), and here is a sample of the paper made from it, sent from the works at South Brooklyn to Stockport, where it was made directly into this brown paper. Here is a sample of white paper, as they call it, a copy of the New York *Tribune* of August 25th, 1865. It is not a very good sample of white paper. The reason is that this steam operation, like the presence of lime, acts as a mordant and fixes the color of the wood into the paper, so that the ordinary bleaching operations will not remove it. In that respect, and in that respect only, is it inferior to ours. In some respects it is fitted for fine kinds of paper because the fibre of bamboo is long and soft, and makes a more silky paper than some of our hard woods. This is the defendants' account of what they were doing.

The gentleman has placed upon his brief, near the close (pages 131 and 133), what is substantially the same decription, though with a little more argument about it, perhaps, than that contained in the answer or given by the witnesses, but it comes to the same result.

But the gentleman said, in his argument yesterday, that they did not use pure caustic alkali. It is shown abundantly by the testimony of their superintendent, Townsend, that they did use pure caustic alkali. While I have several references, I need refer but to one or two.

He says (*p.* 148, *int.* 12) :

"The solution was caustic alkali, mostly the foreign crystal. There were two classes used; some we used on the premises. The two were not used at the same time. It would average about twelve degrees Baumé to the pound of the dry crystal,"

"It was put into the pressure-boiler, and there boiled under pressure with clear alkali" (*p.* 149, *int.* 26).

He describes the mixing and mingling with the lime, and says they drew it off as they wanted to use it (*p.* 152, *int.* 59).

It is very remarkable that after his witnesses had testified that they used the crystal, the counsel should say they did not use the clear alkali. The crystal is "the commercial caustic soda," which became caustic alkali when dissolved in hot water (*p.* 157, *int.* 48). The carbon had been removed from the soda in the preparation of the crystal, while in the ordinary preparation of caustic alkali, lime must be used to remove the carbon from the soda-ash. It is proved that they used pure caustic alkali, which, as the gentleman says, had been known for a great many years. Townsend testifies that the defendants did use the caustic alkali, at a strength from 8 to 11° Baumé (*p.* 152, *int.* 61). It is a little remarkable that the counsel for the defendants should say that the evidence left it in doubt what the strength of the alkaline solution used by them actually was, and that they did not use pure caustic alkali, when he knew exactly what they used; knew also that Townsend held in his hand while tes-

tifying a memorandum showing the strength of the alkali, with directions for its preparation, which he refused to exhibit to the counsel cross-examining him (*p.* 150, *ints.* 41–45; *pp.* 154–5, *p.* 197; *Defts' Brief, Points* 26–27). He states, after refreshing his recollection from the memoranda, that the mixture was compounded from 8 to 12° Baumé, and sometimes higher; that that strength they applied to this disintegrated bamboo to remove what your honors will find described in Rand's testimony as "the incrust"—the toughest part of the intercellular tissue, which clings to the fibre to the last minute, and which can only be removed at a temperature of 313° to 370° (*Rand, pp.* 210, 211, *ints.* 16–21). His experiments prove that a pressure of 60 pounds to the square inch, or a temperature exceeding 310°, must be attained before the "incrust" will be attacked and removed by the caustic alkali.

The gentleman says that Burgess testifies that 290° is "at or near 300°," in the sense in which that phrase is used in the specification. But that is not all that Burgess said upon this subject, and if his testimony on this point is to be considered at all, the whole should be taken together (*p.* 117). He says afterwards that there are some substances that can be removed at 300°, or a little below; but he never uses this temperature for making paper pulp. The gentleman quotes this single phrase from Burgess' testimony, and then attempts to show, by argument, that his invention had been anticipated, because the maximum of the temperature used in former experiments might possibly overlap the minimum extreme named in the Watt & Burgess specification. But this hypothesis is based on accident, not on design; and instead of making clear what was actually done before Watt & Burgess, only shows what might have been done if the previous experimenters had possessed the light derived from Watt & Burgess' discoveries.

I have explained Gros. Take, now, what was done by Wright. Wright was the defendants' witness. He was called upon to prove that he used a pressure of

from forty to eighty pounds (*p.* 165, *int.* 4), and that the samples he had exhibited were made in 1848. Not being produced for cross-examination, he was summoned by the complainants in order to show that he was in error in regard to these statements, and he testified that he used from forty to fifty pounds at his mill at St. Mary's (*p.* 226, *int.* 9), and that these samples were made in 1851 or 1852 at another place called Spring Mill, where he used a similar boiling process, (*p.* 235, *ints.* 90, 93). He, therefore, never came up to the minimum which Watt & Burgess and Mellier required. The gentleman says that the phrase "at, near or above 300°" in the Watt & Burgess specification does not fix minimum, because an infringement may be made at 299°. An infringer might run up the temperature to that degree, and help out his manufacture by some other device, for the purpose of avoiding the patent. But the court would not allow a substantial infringement to go on by one degree's difference in either direction. That was the conclusion of Judge Hall in the case before him. Each of these inventors gave substantially a minimum—310° of Mellier, and 300° of Watt & Burgess—and the reason, as I have already stated, is because there are some portions of the intercellular matter, that cannot be removed under a different and lower temperature. Good white paper cannot be made until these are removed, and that is the object these inventors sought to attain.

Wright used from forty to fifty pounds pressure. It needs but a glance at his drawings to show that the idea upon which Mellier and Watt & Burgess were working never entered his mind. You will find drawings opposite page 633 (Mr. Jenckes here exhibited the drawings, and pointed out the row of boilers, and the number of processes). One singular thing is, that he considered that he had pulped straw by his mechanical operations alone, and that his treatment of what remained, by lime, soda-ash, and heat, was for the purpose of aiding in the bleaching of it; because his original trade

was that of a bleacher, and he had used at Stockport, in England, from sixty to eighty pounds and upwards for the purpose of bleaching. All of these last processes were for the purposes of bleaching, and not for pulping (*Wright's Specification, pp.* 364–5).

It is somewhat singular that Wright did not stumble upon what would make white paper in his numerous experiments; but like many others he was continually unfortunate, and fell short of any useful result.

A glance at his complex specifications reveals the fact that he not only never produced a pulp like that of Watt & Burgess, but never saw or heard of any such pulp, and was not conscious that it existed in the form developed by them in any of the substances he was experimenting with. This is true of all the other specifications referred to.

Wright began his experiments in Stockport in 1839. He set up his establishment at St. Mary's Mill in 1843 (p. 166), and at Spring Mill, somewhere near London, which is the last place, in 1851 or 1852 (*p.* 235, *int.* 92). That is where these samples were made.

At page 236 he describes the mode in which these samples were made. The gentleman did not read the whole description. Wright says:

> "It was boiled in caustic alkali three to four hours without the milk of lime, under pressure from forty to fifty pounds. It was then blown up again by pressure of steam, and drawn into the rag-engine, and washed as before. I omitted to state that after the first boiling and washing the stuff was pulped under the crushing-rollers, and then washed for the second boiling. After the second boiling and washing —after such second washing—it was run into a tub to be bleached with chloride of lime liquor."

There were several operations besides chemical ones, and the result is what we see here—very imperfect straw paper. It was undoubtedly a marvel at the time it was produced. They are all produced by him. There is a very small piece of paper marked Exhibit "P," which is finer than the rest, but it is rather rough. It is entirely clear that if this chemical testimony is

believed, the whole of the intercellular matter is not removed, but considerable remains. If the defendants' counsel had believed that those samples were made of a fibre which is pure cellulose, it was very easy to prove the fact. He might have handed them to his expert, Prof. Rogers, or to our expert, Dr. Rand, and they could have applied the simple tests and given a decisive answer. But he thought it was better to merely show the sample than to prove what it was made of. Rand proves that the samples filed with the original application of Watt & Burgess for their patent in 1854, were fibres of pure cellulose obtained from wood by the process described in reissue No. 1449. (*Rand, p.* 216, *Cross-int.* 65, *omitted by clerk in copying record, and restored by stipulation.*)

Wright says that at St. Mary's "some white paper was made at the first go-off of the mill. There was not much made—from fifteen hundred pounds to a ton, perhaps." That ended the first experiment of making white paper from straw. They made this straw paper afterwards for wrapping-paper—any quantity of it (*p.* 228, *int.* 32). The second experiment was at Spring Mill, and at page 235, he says :

"Q. How much white paper did you make at Spring Mill?

"A. I did not make any.

"Q. How much pulp for white paper did you make there?

"A. As near as I can recollect, about 15 or 1600 weight. That was made for an experiment at the first starting-off; that mill was got up and intended for the purpose of making pulp alone; but that intention was frustrated by the death of the party who associated with me in the enterprise, *who went and hanged himself.*"

Such was the inglorious termination of Spring Mill. It failed and became a dead loss as an investment.

He says the samples of this paper were shown in the exhibition of 1855, at Paris—not in that of 1851, at London, and were given to Dr. Playfair for exhibition in Paris in 1855. It was not till 1857 that Wright exhibited his samples in London (*p.* 166, *ints.* 9-10). The gentleman asks why Watt & Burgess were not

mentioned in the reports of these exhibitions? Mr. Burgess has given the answer. He was working at Gray's Ferry and at Royer's Ford, to demonstrate the fact of which the whole world were then incredulous, as a majority of people are now until they see the thing—that good paper can be made from wood. How could he introduce the invention at a bound? The old means for producing pulp were mechanical altogether. Here comes a man who says to the rag paper-makers, "I can produce a cheaper and better article by using wood, through chemical agencies alone." The paper-makers had no apparatus for the use of the new invention, and when they considered the proposition and saw its revolutionary tendencies, they knew it would make their whole investment valueless. All their apparatus is wholly unfitted for using this process. It was saying to all the paper manufacturers in the world, "Before you can use my invention, you must throw away all you have invested here in mechanical means." How could such an invention make its way except by experiment—by pushing it continually, and inducing men to put their capital and skill with the invention to develop it. The gentleman compliments my clients in that respect, as this invention has already been brought extensively into public use, and has seriously affected the production of paper in this country, and made another paper famine impossible.

These are some of the reasons why Watt & Burgess were not mentioned in the reports of the great exhibitions. Mr. Burgess was working most industriously at Royer's Ford, demonstrating this invention, which required an entire mill, from the foundation up, to be built for its use. I freely concede that Wright was a meritorious experimenter. But he failed utterly. Three times in England he set up paper mills, but each failure was worse than those previous to it.

The gentleman says that Wright sold his processes to Mellier. He gives no evidence of it, but it has con-

firmation in the correspondence of Mellier's attorney with the Patent Office in his application for a patent, where Mr. Beaumont says that Mellier bought this invention and undertook to introduce it in France, and failed (p. 263). It was entirely useless. Then Mellier took up the invention of Coupier and finally proceeded with his own.

It is well to consider the several points of time when these things were done. Burgess makes his experiments in 1851. He produced pulp in 1852. He got so far as to draw a draft specification in 1852, which is in the record (*p.* 171, *A. H. S., No.* 6).

It was completed in 1853, and he took out his English patent on the 19th of August, of 1853, and came immediately to this country to work his invention. Here he got a locomotive boiler which he set in operation in June, 1854; made pulp and sold it before his American patent was issued. He sold it regularly in the market until the Royer's Ford factory was built, and then made the pulp and sold the paper also until the erection of the Manayunk factory. At the time for taking the testimony in this case there were twenty tons a day made and sold in this country alone. The point of time, therefore, when his pulp was complete, was in 1852, or, at the farthest, in 1853. Coupier and Mellier's first French patent was taken out in 1851, and they said nothing about the use of wood in that patent. They knew nothing of Burgess at that time, of course, nor he of them. Their experiments were upon straw. If you produce paper from straw, it does not follow that the same process would apply to wood, and *vice versa*. These things have to be learned by experiment.

In 1852 Coupier and Mellier took out their patent in England. Nothing is said there about wood in connection with alkali. They had a process of pulping by nitric acid, and so in the American patent. But they do not describe the pulp like that of Watt & Burgess, nor is any described in any part of the testimony, and

none such was ever produced. The gentleman says the Coupier and Mellier invention was used in this country for a paper in Philadelphia, and for the *New York Times*. That does not appear in evidence. It is stated in some of the correspondence with the Patent Office. But it was used at some time. It was soon discovered to be impracticable and unprofitable, and abandoned. Mellier abandoned it himself and proceeded with his own invention; obtained a patent in France in 1854, after Watt & Burgess were at work at Gray's Ferry. But the patent of 1854 did not contain a description of his process or of any process that would produce a valuable result. It was the addition of 1855 (*p.* 252) to that patent under the French laws in which we find the strength of the alkali and degree of heat. That was the first date at which that description of the process was given to the world, although it might have been used in France in 1854. These inventions were so nearly contemporaneous that they cannot be used the one against the other in either direction. They are also in the same proprietorship now. Thus we trace the Watt & Burgess invention from its commencement until its full development.

These considerations seem to me to dispose of all this evidence upon the issues of invention and infringement.

There remains only the question whether the original and reissued letters patent are for the same invention. The gentlemen says we did not call experts upon that question. It is impossible that I should have had the idea of calling experts. What does he ask of experts? Consider for a moment. It is a wonder that he did not smile if he did consider. Place in the hands of an expert one written instrument, the patent of 1854, and another written instrument, the patent of 1863, and ask: "Do you find these the same; do they describe the same thing?" Why, if they did, the patentee must have been very silly indeed to have taken out the reissued letters patent. It was for the

purpose of altering the description that a reissue was taken. No one could say that they were identical. Indeed, the expert, confined to the language of the two instruments, might say that they were for different inventions as to processes. Of course the changes in the description of the process must be material, for if the variance between the description in the original specification and the process as actually worked is not material, there would be no occasion for a reissue. The privilege of reissue is given by the law in order that defects of omission and excess in description, occasioned by inadvertence, may be corrected. Unless these defects are substantial and material, the original specification may as well stand, for there must be some inaccuracies in all such descriptions of process.

But no one has questioned their identity as to the product. No one has ventured to say that the pulp described in the original and reissued patents is not one and the same. *Renwick* (*E. S.*, *p.* 324, *cross-ints.* 32, 33), thinks Watt & Burgess lost their right to claim the pulp by abandonment, by "giving their invention to the public;" but this is a question upon which this court have expressly ruled otherwise in *Battin* vs. *Taggart*, 17 *Howard*, 74. The defendants' expert testimony on this issue relates to the process patent alone.

Besides, this comparison of written instruments is a matter not within the scope of expert testimony.

Take the patent of Goodyear. The original patent was for the triple compound and the process of mixing it. Lay the original specification beside the reissued patent for the product. I have a recollection of an attempt to introduce testimony of that kind in some cases upon that patent, but I think it was considered by the court that it could not be done. If I understand the decision of this court it is to this effect: Do the specifications of the two patents, the original and the reissue, cover the same field of invention? If in a machine do you find that which is described in the reissued patent in the model or drawings filed in the Patent

Office? If so, no matter what errors existed in the original specification, if they can be pointed out and corrected according to the fact.

The case of *Battin* vs. *Taggart*, shows that where it was attempted to be maintained that the non-claim of a portion of the machine for a long time was abandonment, the court decided it was not necessarily an abandonment.

So of a chemical patent. What is the field of invention in which the patentee was working? What did he begin at, and what did he end at? Take these two specifications and you will find that the patentees began with a chip and ended with a pulp. In the original patent there is a clear description of what is called a three stage process—boiling in alkali, intermediate treatment with chlorine gas and subsequently washing in weak alkali; and then bleaching or not, as the parties see fit. What was the effect of the operation? That the washing with weak alkali was of no use. That is seen from the testimony and seen from any of these old specifications. If it was of no sort of use it would mislead the public, and it was the duty of the patentee to remedy the defect in his original patent, by a disclaimer. He should have gone to the Patent Office and said, "I find that is no part of my invention, and I wish to strike out of the claim all that refers to washing in weak alkali

So, also, of the chlorine gas. He might have said, "My first boiling in alkali is sufficient to produce the pulp. The next operation with chlorine gas may or may not be necessary, according to the kind of wood which you choose to use; therefore, I would disclaim the use of chlorine gas except as to resinous woods." He might thus have amended his patent in that respect.

But in the third respect he could not have so remedied it but by reissue. His description is either with or without pressure in the original patent. He does not claim to be the original inventor of pressure. He ex-

plains that in his testimony. He ought not to have used language which would have implied that he was the first inventor of pressure—of boiling at a high temperature under pressure. He was not skilled in the use of technical language, and he uses a phrase which has been used against him. He was in error in disclaiming it as a part of his process. He was right in disclaiming it as part of the original invention, because he did not invent it. In his reissue he describes and claims it as a part of his process, which he has a perfect right to do; and in that respect he corrects his original description. One part of the invention he lets fall entirely. That is, the open boiling at low pressure and subsequent treatment by chlorine. I concede that that was very similar to the invention of Coupier & Mellier, and very nearly of the same date. It is useless and unprofitable, and there was no reason why he should take a third reissued patent for the purpose of preserving and claiming it. It was valueless and rightfully dropped. The patent now stands upon the inventors' own original act, if I may say so, by which pulp was produced—the boiling of pieces of wood in a close vessel at a high temperature.

Then his original patent was defective in several other particulars (see *Brief*, *pp.* 70-71). The gentleman says that his previous patent did not name in either direction any limit to the degree of temperature. That was a defect in the original Watt & Burgess' specification. Burgess explains it in his testimony by saying that he had not any means of measuring the degrees of temperature at that time, but afterwards he had; and he became aware that the specification of his patent, standing as it was originally written, was liable to mislead the public. It would require experiment to have exercised the invention by any other person when he alone knew exactly how to use it (see *Brief*, *pp.* 61–87).

He believed that he had originally described a process which might be used with or without pressure,

and when he became aware of his error, he proceeded at once to correct it. This correction was made in the reissue of 1858, as well as in the reissues of 1863. All the corrections are made according to the fact of what was actually invented.

There have been inventions, the process of using which could not have been described even approximately at the time when it was made; one of them I refer to is the invention of Palissy (see *Brief, pp.* 105–107).

As I said yesterday, an invention of a result may be complete when the process cannot be accurately described; I mean the invention of the product itself, where the invention is a result, as in chemistry. In a machine this result may be exhibited visibly, but these operations which take place in closed vessels at a heat above the boiling point, and with high pressure, or in furnaces at a white heat, no one can observe with his unaided senses alone. The first experiments, even with proper instruments, are almost sure to go wrong. We must be satisfied before we can ask a court to sustain us upon such an invention that a practical and useful result has been produced, that could be seen and shown. If, in the description of the process, the inventor says that something must be left to the judgment of the operator, his patent will not be void if he tells the truth. But if he knows and does not tell the secret, his patent will not be good. If he learns afterwards what the operation actually is, he is bound to tell in a reissue. This I hold to be the proper exposition of the law; this was just what these patentees did.

Take the varieties of glass and porcelain and some others in the ceramic art which was practiced in a great many portions of the world. These articles were made not only for years but for centuries before the process could be described intelligibly, and yet the result was well known and recognized in the arts.

Here, from a log of wood a book was produced by

certain means known to the operator and inventor, and yet he could not put upon paper the exact strength of his alkali, the degree of heat to be used, or the proper length of time of the operation in all cases, but used his judgment about each with greater or less success.

But the result was there attained. Watt & Burgess had made a contribution to the arts of their discovery of wood pulp as a product, and had in an imperfect manner described the chemical agencies by which the result had been attained. It is clear on the face of the patent that the pulp was produced, because they say so, and it is not shown that it was ever produced before by such agencies. The description which they gave was imperfect, both in omissions and redundancies. The description which they now give is admitted to be perfect. We follow it exactly. Anybody can follow it. It does not take any high degree of skill, but any person acquainted with the English language can follow it. We have remedied the defects which we admit. It needs no argument for the gentlemen to prove that a vagueness existed in our original patent. In the reissues we have limited the scope of the invention, not enlarged it. The original specifications of Watt & Burgess might have admitted an unlimited claim. It did not mention the minimum or the maximum of either of the elements it works with. The reissues do mention a minimum and a maximum. When we name the minimum and the maximum do we enlarge the claim of the patent? That is a novel sort of logic. When we state in the specification the length of time proportioned to the strength of the alkali, also proportioned to the different degrees of heat and the several kinds of wood operated upon, it seems to me to be a limitation upon the language used before which placed no particular limitation in the use of these elements, but left all to the judgment of the operator.

The cases which he refers to upon the reissued patent, where the claims have been enlarged, can have

no weight here, where the claims have been narrowed.

The Mellier patent is a patent for a process, as I have already explained, within certain limited temperatures, and with a lower strength of alkali than the Watt & Burgess. A particular mode of treatment also is necessary, growing out of the use of other materials (*see Brief, pp.* 113–119).

It seems to me that the confusion arising in the minds of experts, and which arose in the Patent Office, came from the fact that the inventions were not looked at from a proper point of view. These are purely chemical inventions; they cannot be the result of *a priori* reasoning from any known chemical laws, but must be arrived at upon chemical experiments. The result obtained—the central point of the invention—is the pulp. That is the inventor's contribution to the useful arts. The thing to be manufactured into paper is the intermediate stage between the pine plank and the ream. Finding that to be the original invention, we can stand upon that and look off in any direction and find processes of the same general character for obtaining it. There is one in the Coupier & Mellier process as to the nitric acid, but it is only a laboratory experiment, and has never become available. There are three before your honors, the original Watt & Burgess, boiling with low degree of pressure, subsequent treatment with chlorine, washing, &c., which is dropped from their reissued patent. There is the boiling with high pressure and treatment with chlorine in the reissued patent, as applied to resinous woods; there is boiling with strong alkali, at a high temperature, applicable to all woods. There may be, for all I know, thirty other ways; for there is no saying in what direction invention may branch out. Giving them the central point to start from, and each patent for each process would be good. But for the substantive invention we have shown them to be the first inventors, and we are entitled, as we humbly submit, to the protection of the law for these inventions.